ANNALS
OF
OTOLOGY, RHINOLOGY
AND
LARYNGOLOGY.

VOL. XXI. JUNE, 1912. No. 2.

XII.

THE PRESENT STATE OF OUR KNOWLEDGE CONCERNING HAY FEVER.

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Dr. Hanau W. Loeb has requested me to review our present knowledge concerning hay fever for the readers of this Journal. Such a review is timely now, just ten years after the completion of my first series of investigations on hay fever.

In 1902 I published,[1] as an appendix to a presentation of the history of our knowledge of hay fever, the opinion, based on experiment, that hay fever is a disease caused by a poison derived from plants. These toxic substances are found in the dust of the blossoms of certain plants. They are present in the albumen of the pollen and are specific in nature. According to this theory, it would be possible by means of the isolated toxic albumen of the pollen to determine whether or not a given disease was hay fever. It was also hinted, and in a publication that shortly followed[2] positively asserted, that it was possible to produce a specific antitoxin by inoculating animals, e. g., rabbits or horses, with the albumen of the pollen. It was possible with this antitoxin to neutralize the poison of the pollen

in vitro so that the latter would no longer cause symptoms in hay fever patients. It was also claimed that symptoms that had already set in could be overcome by the use of the specific antitoxin.

By means of the timely use of the antitoxin the outbreak of the hay fever symptoms should be prevented. As a result of further investigation I was later able to prove definitely[3] that by proper use of the antitoxin it would be possible to rid patients of their disposition to hay fever, and to immunize them so they could dispense with the use of the antitoxin or any other therapeutic agent without having to fear further attacks.

Th. Albrecht, the secretary of the German Hay Fever Association, designated the appearance of my first article as a turning point in the history of hay fever. Other colleagues viewed the results of my comprehensive work with less favor. There were indeed those who claimed that I had added nothing new to the subject. The opinions expressed by the laity were also widely different in character. Some were unable to express their thanks in terms sufficiently strong, others claimed that the specific treatment suggested by me was absolutely worthless. An American correspondent writes to me: "Your stuff is not worth a tinker's dam." In the face of such divergent opinions it seems worth while to cast a glance backward over the decade that has passed, to determine what assertions were right and what opinions were incorrect.

Whether we are right in looking upon hay fever as a product of our modern culture, appears to me today, even more than it did ten years ago, an open question. In the last ten years there has been much published concerning hay fever, not only in the leading medical journals, but also in the lay journals.

In so far as the latter deal with my work, they have not had my cooperation, nor have they consulted my wishes. There are today yet many hay fever patients who are absolutely in the dark as to the nature of their disease. Even here in Hamburg, after a scientific exhibition at which my hay fever material was shown, many adults came to me with the request that I should determine whether or not they had hay fever. I was even more surprised to learn that there are today physicians who either deny the existence of hay fever or know nothing about it. In view of this obtuseness it seems to me very bold to say that two hundred and fifty years ago there was no hay fever, simply be-

cause we have no authentic and convincing records from that time. The disease may have been very widespread then. There was missing perhaps only the man to notice the periodicity of the disease, its dependence upon the seasons of the year, and to correctly correlate the facts and draw proper conclusions.

The oldest convincing hay fever history is that of Benningerus in 1673. He describes the case of a woman who yearly, at the time that the roses began to bloom, began to have sneezing attacks of several weeks' duration. Not until one hundred years later do we again find hay fever referred to, by Heberden, an English physician. It was, however, John Bostock, who himself had hay fever, who in the year 1819 first gave us an exact clinical picture of this disease. The clinical picture described by Bostock is so complete that there has been in the meantime no necessity to correct or to add to it. He knew only the European type, not the American autumnal catarrh, to which I shall refer later. When the season approaches the hay fever patient experiences at first an occasional itching at the inner canthus of the eye, at the caruncle. This itching appears, soon disappears, and may in a few days again assert itself. This time it may be somewhat more annoying and there is seen a definite reddening of the caruncle, perhaps also of the adjacent conjunctiva. Then there occur mild and infrequent attacks of sneezing. Suddenly the condition gets worse. Perhaps while taking a walk on a warm sunny day the patient has paroxysmal attacks of sneezing which interfere with his respiration. The eyes itch fiercely, the conjunctiva becomes red as fire and edematous. The patient can no longer breathe through his nose, the mucous lining of the mouth begins to itch, especially the gums. There follows a condition of malaise and general weakness which may become so marked that the patient must take to his bed. He is very depressed, robbed of all his energy, and loses the joy of living. In some cases asthmatic symptoms appear so that during the night the patient cannot rest. Finally many patients suffer with an unbearable itching of the skin. All symptoms may disappear for several days, the patient seems to be well, only to have the symptoms reappear again.

This mysterious changeable condition lasts, as a rule, six weeks and then gradually disappears. The attacks become lighter and more infrequent, resemble those of the onset, and gradually disappear altogether.

The following year they return again punctually, and he who has once had hay fever, as a rule, may look forward to having it all his life. This disease has always been called hay fever because the patients claim that they feel feverish. In almost no case, however, is there any elevation of temperature.

In the United States of America a spring hay fever also occurs, seldom, however, when compared to the autumnal catarrh which usually appears early in September, with the same train of symptoms and lasts about six weeks.

ETIOLOGY.

The above description, which is that of John Bostock, shows us that he had a very definite idea of the disease. It was, however, a long time before physicians generally learned to know the condition. Even today hay fever plays but a very small part in clinical instruction. Many a physician admits that he learned of the disease only accidentally. This is very remarkable, in view of the fact that hay fever is one of the most widespread of all diseases. It does not, it is true, belong to those plagues which destroy human life. It is, however, the cause of so much suffering that those afflicted with it yearly are robbed of much of the joy of living and eagerly yearn for the end of their miserable existence. As soon as the period of suffering is over all this is forgotten, they rejoice doubly because of their new feeling of wellbeing, and not until next year do they again begin to worry and feel anxious. Hay fever may well be compared in this respect to seasickness. This also is a cause of fear and terror for those who have once had it, and who are contemplating another sea voyage. They also are not regarded by clinicians in a serious light. These diseases offer a rich field for the pharmaceutical industry, which annually floods the market with sure remedies for both diseases, remedies which are found to be useless. The idea that hay fever patients are all nervous, very susceptible to suggestion, that, in other words, the disease is purely an imaginary one, may be due to the fact that physicians have been so little interested in the condition. Bostock was not of this opinion. He believed that there was an external irritant that caused hay fever, such as moist heat, dazzling light, or dust. These are all things, however, that are not peculiar to any season of the year. Elliotson was the first to suspect the pollen, and Blackley brought to the support of this opinion in

1873 some ingenious experiments. He caught the pollen by means of glass plates which were covered with glycerin, and was able to prove in this way that the pollen could be carried by the air for long distances, but was found in the air over large areas only during the hay fever season.

Blackley was able to cause in hay fever patients asthma-like symptoms by inhalations of the pollen, and by rubbing the pollen over scarified skin of the forearm and leg, he was able to cause erythema. Blackley's theory had at that time many supporters. In course of time, however, its critics won the upper hand.

With the beginning of the bacteriologic era hay fever began to be considered an infectious disease. Helmholtz was the first who described a microorganism resembling vibrios as the cause of hay fever. Later authors, especially Heymann and Matzuschita (1901), as a result of their experiments, cast much doubt upon the pollen theory. They incline to the belief that hay fever is an infectious disease due to bacteria, and lend support to the opinion of George Sticker (1896), who, as a result of a critical review of the literature up to that time, had declared himself in favor of the infectious theory. This excellent investigator declared at that time that the conception of Binz that hay fever was a parasitic disease, that it was a disease due to bacteria, would some day be generally accepted.

Another older hypothesis had until the year 1902 many warm supporters. According to this theory, hay fever was caused by emanations from plants. These emanations are further described by some as delicate odors, finely divided ethereal oils which develop under the influence of strong sunlight at the time of the first blossoming. How far afield such speculations can lead one the following example will show:

Charlton Bastian had an attack of hay fever as soon as he took from his collection certain parasites which were preserved in alcohol. As neither the worms alone nor the alcohol alone caused an attack of hay fever, he argued that the cause must be the combination of both. On looking closer into the matter we find that he always lectured on these worms in hay fever season. A similar explanation holds good for all stories concerning attacks of hay fever after looking at an artificial rose or at the picture of a blossoming field, which have been cited by various authors to prove that the condition is a purely hysterical one.

It may be looked upon as a fact that many people show some of the symptoms of hay fever when they are in the neighborhood of cats, mice, dogs or horses. In one case in which a cat caused the attack, it was proven that the presence of this cat was especially liable to cause symptoms just after it came from the hay loft. Its fur was at this time covered with grass pollen which was conveyed to the patient as she caressed her pet. It has been my experience that patients who cannot stand the odor of a horse have real hay fever. It may, however, be assumed that such susceptibility to certain odors is a distinct condition that can exist separate and apart from hay fever.

There has lately come under my observation a case of this kind which is still a mystery to me, but which I hope to clear up. A lady in whose family various sorts of idiosyncrasies have occurred was perfectly well up to fifteen years of age, when, after a very severe illness, she acquired hay fever. Since then all cats or horses cause hay fever symptoms. Formerly she rode and drove a great deal, today she cannot ride in a carriage without an attack of hay fever. She tells me that if she touches a cat, which has never been near a hay loft, she gets a violent attack. After I had determined that the lady reacted to pollen toxin, I had a cat brought into the room, the patient stroked the animal a few times and then rubbed her hand over her cheek, keeping her eyes closed. Neither her hand nor her cheek showed anything, the eye also remained unchanged for fifteen minutes. I already believed that the whole thing was due purely to suggestion. The patient, however, asserted positively that the attack would come. After fifteen minutes she declared that her eye had begun to itch, the conjunctiva began to grow red and the injection grew more and more pronounced. The carnucle was a deep red and the itching and burning became more severe. The patient was sure that if we allowed the experiment to take its course that she would have a severe attack of hay fever. At this point I applied some pollen antitoxin to the conjunctiva. The patient at once experienced great relief and after a short time all signs of inflammation began to disappear.

I am now trying to determine whether a definite chemical substance can be isolated from the hair of cats which has such an intense and peculiar action. The fact that this idiosyncrasy first appeared together with the hay fever, and that pollen anti-

toxin was able to allay the symptoms, seems to prove that it is closely related to real hay fever. After such observations it is no longer possible for us to ignore the many reports that hay fever patients give us concerning the effect upon them of dogs, cats and horses, but it is also certain that many of these reports in the literature of hay fever do not deserve serious consideration.

In 1896, George Sticker, in the light of everything that was then known about hay fever, effectively combated the theory that the disease is a psychic affection. In view of the publications concerning hay fever which soon after appeared, one is led to believe that from that time on the bacteriologic conception of the disease held sway. The hay fever patients of that time, however, probably had a quite different opinion; they had to suffer under the stigma, at that time so general, that only hysterical people could get hay fever. The hay fever patient hardly dared to mention his troubles. He retired as far as possible from the world as soon as the hay fever season came around. He did not wish to be looked upon as an imaginary sufferer and lose all claim to the title of normal, rational human being. The great majority of doctors look upon hay fever as a nervous affection, or at least as due to suggestion. Several authors declared that hay fever was the result of a pathologic condition in the sympathetic system. The hypothesis that won most favor was that declaring hay fever a psychic affection. Hay fever patients were not only made the butt of jokes by their friends and physicians, but it was seriously questioned whether they were not fit subjects for isolation and confinement. In 1902 there appeared a publication by J. Rudolph, in which hay fever was characterized as a degenerative psychosis. Rudolph recognized a hysteroid and an epileptoid form. At any rate, he was sure that this disease belonged in the rubric of psychopathology and that the therapy accordingly should be altogether psychic.

AUTHOR'S OWN EXPERIMENTS.

Until ten years ago no one had been able to offer a clear and convincing explanation of the cause or nature of hay fever. This is clear from a perusal of the literature up to that time.

The author, himself a sufferer from hay fever, had the opportunity during many years to test the merit of the various hypotheses concerning the cause of the disease. He finally

came to the conclusion that only the pollen theory could be right. In the monograph concerning hay fever, which I have quoted above, I described the observations which forced me to accept this explanation. For many years the attempt to definitely prove the theory met with an obstacle which seemed insuperable, viz., the impossibility of getting pollen in a pure state. In view of the extremely simple method of doing this, this fact appears to me today a remarkable one. I feel constrained to offer the following explanation: Year after year I consulted with botanists as to the best method of getting pollen in large quantities. Various methods were suggested to me, among others that of spreading large cloths over the meadows. I also sucked up into bottles large quantities of air in the attempt to get pollen, and attempted many other things. None of these methods met with more than moderate success until finally I hit upon the simple procedure of shaking blooming plants, for instance stocks of wheat, and catching the dust that was shaken out. I succeeded better later by taking the ears shortly before they began to bloom and putting the stocks in water in a warm place. In this way I was soon able to gather pollen in large quantities and, more important still, to isolate the pollen grains of different plants, free from all contaminations, including microorganism.

After having obtained in this way the pollen of rye, wheat, and Raigras pollen (Lolium perenne), I could at once begin to attempt the settlement of important questions. A minimal amount of the plant dust when introduced into my conjunctival sac, or my nasal passages, caused in a very short time most pronounced hay fever symptoms. The same experiment on my laboratory assistant, who did not have hay fever, had no effect at all. Within a few days I extended the scope of my experiments so as to include two hay fever patients, who happened to be working in our institution, as well as three other assistants who did not have hay fever. The result was always the same. The hay fever patients reacted just as I did. Those who had no hay fever and served as controls were not at all affected by the introduction of the pollen. These experiments were repeated later on very many patients and people without hay fever, invariably with the same results.

The next important point that suggested itself to me was to determine whether or not this toxin was active at other times

of the year than during the hay fever period. Formerly it had been urged against the pollen theory that with the same pollen which had been active during the hay fever period, no results could be achieved at other times of the year. Thus, for instance, Sticker was of the opinion that Woodward had proved that pollen was inactive except during the hay fever period. He therefore was forced to come to the conclusion that for the production of an attack there was necessary the disposition on the part of the individual and the season of the year. The nature of the action of the season of the year was explained by some authors as a sort of an "Unstimung," a sort of spring revolution. This explanation appeared to me very doubtful, because of the fact that this process occurs in European patients in springtime; in most American patients, however, in the fall.

My experiments on this subject resulted as follows: Pollen which had been carefully dried soon after gathering was active later at any time of the year. Pollen, however, which I enclosed in bottles in its fresh condition underwent certain changes, characterized especially by the formation of a liquid.

Pollen which had been spoiled in this way proved later to be inactive. I might add here that these observations explained the occurrence of sporadic cases of hay fever in the winter time. Pollen which has found its way into a dry room can remain active until the winter season—indeed, for many years, as I have shown. One blossom which has remained for eleven years in the herbarium retained an undiminished activity. Pollen which, on the other hand, falls to the ground in the open air, is destroyed by the first following rain. The fact that the pollen is carried down out of the air by the rain clearly explains further the remissions on certain days which had hitherto been so difficult to understand. By means of the isolated pollen I had then met those requirements in my attempts at an etiologic explanation which I myself have considered necessary. The suspected agent, free from all impurities, when applied to a hay fever patient, must produce hay fever invariably, regardless of the season of the year. The same agent applied to a normal person must have no effect. These requirements had, I say, been met by experiment.

The grass pollen is so small that a single one cannot be seen with the naked eye, yet its structure and chemical compo-

sition are very complicated. Many pollen grains are covered with hairlike prickles. Adherents of the pollen theory formerly believed that hay fever was due to these prickles. They asserted that hay fever patients were extremely sensitive to the mechanical stimulus of the prickles, and that normal individuals were resistant to their action. It is true that some of the pollen, which we formerly looked upon as the cause of hay fever, had an uneven, prickly surface. Some of the first adherents of the pollen theory believe that those pollen especially were active whose blossoms had an intense odor. The disease was accordingly at that time widely called rose fever, linden fever, and so forth, instead of hay fever. I was able to show that those pollen which most often cause hay fever have a smooth surface. This is true of all grass pollen, of which I have examined thirty-two varieties. These have also no odor. The blossoming of the rose and of the linden occurs at the same time as that of the grasses. In 1902 I was able to completely overthrow the belief in the activity of the linden. It happened that in that year the blossoming of the linden was delayed from three to seven weeks in our vicinity, that of the grasses occurring at the regular time. The season for hay fever was probably over at the time that the blossoming of the linden was at its height, and hay fever patients were able to enjoy the odor of the linden without any ill effects. I can well understand the tenacity with which hay fever patients cling to the belief that the dust of the rose and linden causes their symptoms. I myself banned from my home every rose and other odorous blossom during the hay fever period, and felt certain that my suffering was thereby diminished. The relief was not an imaginary one, but was due to the fact that at the same time I kept my windows carefully closed.

At about the time of the blossoming of the grasses, the pine (Pinus silvestris) also begins to blossom and produces such a plentiful dust that thick clouds of it can at times be seen. This is called sulphur rain. I proved, in spite of the opposition of many hay fever patients, that the dust of this blossom was also of no consequence.

By such experiments as these and many others I was able to prove that only certain specific pollen could cause hay fever. This was in direct opposition to Blackley's theory. Other pollen, including those possessing sharp prickles, were absolutely without effect.

The theory as to emanations, odors, ethereal oils, and so forth, had still to be considered. On opening a vessel that contains much grass pollen one gets an odor much like that of honey, which proved to be without effect on hay fever patients. The odor of the linden, as well as that of the harmless rose, was proved to be without effect. There was still to be considered the questions as to the action of the ethereal oils. An extract of the oily and waxy portions of the pollen, when applied to the conjunctiva and nasal mucous membrane in small amounts, caused a burning sensation. This was quite different, however, than the peculiar sensation experienced by hay fever patiens, which is so distinctive that nothing can simulate it. These extracts had more effect on normal persons than they had on hay fever patients. The amount of these substances with which we come in contact in our ordinary walks is so small that they can surely not be responsible for any of our unpleasant sensations.

Grass pollen is distinguished from that of other plants in a marked way by the small rods which it contains, which look just like bacteria. Patton, in 1877, had already called attention to these rods. He believed that after they left the pollen grains they possessed a movement of their own, and he drew the conclusion that they constituted the active principle of the pollen. He asserted that by reason of their inherent motility, they found their way into the mucous membrane and the circulation and thus caused the symptoms of hay fever. For a time I also believed that these small rods played some part in the production of hay fever. I did not know then that they were composed solely of starch, but thought they also contained albumen. After I was able to get hold of great quantities of grass pollen I was able to isolate these rods by means of repeated centrifugation and washing. I was then able to prove that they were absolutely innocuous to hay fever patients.

As a result of certain observations, to which I shall refer later, I was soon forced to the conclusion that the active principles of the toxin of hay fever is an albuminous substance. The alcoholic precipitate from a saline extract of a comparatively small number of pollen grains had an intense action on hay fever patients, but none on normal individuals. After I obtained large quantities of pollen I began my experiments with the isolated albumen. Against this method of procedure

it was claimed that I had not been working with a true hay fever toxin, but with a denatured poison. For this claim there is no evidence; the critics failed completely to show any proof for the correctness of their assertions. From a purely scientific viewpoint, it is certainly better to work with the isolated toxin than the whole pollen grain or an extract from them such as I used at first, before I realized that the toxicity was an attribute of the albumen alone.

Dr. O. Kammann,[4] who investigated this matter at my request, was able to prove that the albumen fraction contains the toxin and that the globulin fraction is entirely inactive.

Having determined that the albumen of the pollen is the specific cause of hay fever, it was possible now to carry out my experiments along quantitative lines. It is possible to extract the albumen from the pollen by means of saline solutions of proper strength and then to precipitate it with alcohol, or to obtain it by dialysis, and then dry it. In this condition it retains its activity for many years.

The experiments which I had done up to this time on hay fever patients had not conformed to the natural processes. In order to conform to these more closely I performed the following experiment: A hay fever patient and a normal individual took their places in a large glass cabinet in which rye pollen had been disturbed. The hay fever patient took sick, the other remained well. It was not determined by this experiment how much of the pollen had been taken up by the hay fever patient. The question as to whether or not enough pollen was present in the air during the hay fever season to cause the symptoms had not been satisfactorily settled. Blackley (vide supra) had already made attempts to settle this question by means of a method worked out by Phoebus. He had carefully counted at different periods of the years the pollen which gathered on glass plates, whose surface had been covered with glycerin. My coworkers, especially Liefmann,[5] found that in the heart of Hamburg, while hay fever was at its height, 250 pollen grains accumulated on a surface of one square centimeter during twenty-four hours, i. e., 25,000 to the square meter. It was established that with the first appearance of the pollen in the air the patient began to complain of an itching of the inner canthus of the eye; their suffering became more intense in direct proportion to the quantity of pollen in

the air. On rainy days no pollen accumulated on the glass plates, although they were protected from the rain. Early in June the pollen of the grasses far exceeded those of other plants in numbers, and from about the third week in July grew gradually less, so that at the end of July, or the beginning of August, only a few stray grains were found. Thus can be explained the periodicity of the course of hay fever and also the occurrence of sporadic cases after the hay fever season is over. There was still no certain method of predicting quantitatively the action of the pollen. Dr. O. Kammann had shown that the organic portion of the pollen of the grasses is about 40 per cent albumen. He had shown further that about 20,000,000 rye pollen weighed one gram. By means of these figures we could compute the amount of toxin in a single pollen. By means of a solution of known strength of the poisonous albumen of the pollen, it could be determined how many pollen grains were necessary in any given case to produce mild, moderately severe, or severe symptoms. It was evident that different patients were susceptible in varying degrees. A concentrated solution introduced into the conjunctiva or nose of a normal individual causes no symptoms. The majority of hay fever patients were stimulated by one drop (1/20 to 1/30 cm.) of a solution of 1 to 20,000 or 1 to 30,000. There were patients, however, who responded to one drop of a solution diluted a million times, the equivalent of the amount of albumen contained in one to three pollen grains.

Liefmann[1] constructed an aeroskope by means of which he was able to determine how much pollen was taken in with each breath. In the neighborhood of a field of rye one inhales with each breath two to three pollen grains; in the middle of a large city he found that in every cubic meter of air there were about three hundred and eight.

Thus in this way questions as to the quantitative relationship of the pollen to the attack were satisfactorily answered. By means of these experiments it had been plainly shown that the albumen of the pollen of certain plants, especially that of all grasses, is to be looked upon as the active cause of hay fever. With my coworkers I examined the pollen of 106 plants, and found them all without any action, although I had examined such pollen which had been considered capable of producing

hay fever. In addition to the pollen, I had been informed that in China at the time of the blossoming of the Ligustrum vulgare a disease very much like hay fever was prevalent. I examined the pollen of this plant and found it active. In southwest Africa, when the grasses blossom, conditions like hay fever prevail, especially among the half-breeds. One European had to forsake Africa at this time on account of his intense suffering. In Europe he remained perfectly well. On examination it was found that he did not react to the grass pollen. In Africa, however, at this time, the acacia blossom, and it has been looked upon as the cause of the condition. This patient was unaffected by the pollen of two different species of acacia. I am in hopes that experiments which we have since then set on foot will explain this disease to us. In addition to the thirty varieties of graminacæ and cyperacea, I have found the pollen of the following plants active: swamp pink (Lonicera caprifolium), lily of the valley (Convallaria majalis), hairy Solomon's seal (Polygonatum multiforum), Oenothera biennis, rape (Brassica napus), and spinach (Spinacia oleratea).

Of special importance is the autumnal catarrh, which occurs in the United States of America, beginning early in September and lasting about six weeks. This autumnal catarrh is much more common in the United States than the vernal catarrh. I have had the opportunity of examining a large number of American hay fever patients, and was able to establish the fact that those patients who only suffer in the fall do not react at all to the albumen of the grass pollen. They do react, however, regularly to the albumen of the pollen of goldenrod (Solidago) and of ragweed (Ambrosia). I have examined a large number of species of both these plants and they were all active. These patients also react to the pollen of the chrysanthemum and the other asters. Those American patients who suffer only from spring catarrh, not from the autumnal type, react only to the grass pollen, not to that of the goldenrod or the ragweed. A third group of patients suffer from about the middle of May until early in November with a hay fever like affection. These unfortunates react both to the grass pollen and to the active agent of the autumnal catarrh. Goldenrod and ragweed are very widespread in the United States. They are found not only on meadows, fields, roads, and along edges of woods, but grow in the midst of the cities

in neglected places. In Europe they do not occur naturally, indeed the goldenrod can with difficulty be made to blossom here. The pollen of goldenrod, however, is not scattered as easily as that of the ragweed. All attempts to grow ragweed in this country failed until 1911. In this year, which was extremely hot and dry, I succeeded for the first time. These facts serve as further important supports for the pollen theory. There were, however, still many questions to be settled before all the mysterious phenomena which characterize hay fever could be explained.

One very important question, that of individual predisposition, I have only lightly touched upon. It is clear that all people, including the inhabitants of large cities, are at certain times of the year exposed to the pollen of many plants, which settle on their skin, conjunctiva, are inhaled into the nose, and taken up into the mouth. By far the largest part of these individuals are unaffected by the pollen, only a very small percentage take sick. The poisonous albumen of the pollen is a substance, therefore, which is innocuous to most people, and is only active in those cases in which there is a special susceptibility. In other words, hay fever requires an individual predisposition. This personal predisposition is present for the well known poisons of the pharmacopeia, either not at all or at most in very slight degree. In the case of the infectious diseases it is much more evident. If, for instance, the cholera or typhoid bacillus is spread through a city by the means of the water supply, only a small percentage of the inhabitants are inaffected. This can be explained on the theory that the cholera organism does not find in most individuals those conditions which are necessary to its existence and growth. The fact that only about half of the cholera patients die can be explained by similar quantitative differences. I do not know of another instance of a substance absolutely inactive as far as a part of the population is concerned, but a very virulent poison for others. The individual predisposition in a case of hay fever must be of a peculiar sort. It might be explained that the hay fever poison enters the circulation of some people (hay fever patients) and not of others. That this is the case I could prove by the demonstration of antibodies in the blood of hay fever patients. I shall return to this subject later. Here it is sufficient to say that these specific substances could be found only at the close

of the hay fever period, six months later they had disappeared. In normal individuals they could at no time be demonstrated. The gradual disappearance of the immune bodies is easily explained. We know from animal experiment that these substances appear a certain time after infection, gradually to disappear again. At first blush the demonstration of immune bodies in the blood of hay fever patients would seem to be a sufficient explanation of the hay fever predisposition. Closer study makes this seem uncertain. On continuing the experiments I found that these immune bodies were not present in all patients, indeed, in the same patients I could not find them in some cases two years in succession. The following objection to this explanation was even stronger: A colleague of mine, disposed to hay fever, who had helped me for many years, allowed himsef to be injected with a solution of pollen albumen. One-half an hour after the injection marked symptoms appeared in the eyes, nose and mouth. The patient experienced pains in the chest, expectorated a tenacious, mucoid sputum and perspired freely. The respiration became rapid and difficult, the pulse rate was accelerated, the voice grew weak. After fifty minutes there was a flat, urticarial eruption over the whole body. After twenty-four hours all the results of the injection had not yet disappeared. At the site of the injection there was a marked swelling, which persisted for five days.

Injection of hay fever toxin caused the same symptoms in me. A colleague who did not suffer with hay fever reacted to the same dose with a small, almost imperceptible swelling at the site of the injection. Pollen albumen was, in other words, not toxic for him when introduced under the skin. Hundreds of experiments have proved to us that pollen albumen is not a poison in the ordinary sense of the word, and that even when introduced into the circulation is inactive. Not only is the skin of hay fever patients permeable for the hay fever poison in varying degrees, but it also reacts to the toxin in different ways in different patients. In some cases when a solution of pollen albumen is placed on the skin, there occurs within a few minutes an erythema. If, on the other hand, a patient is very susceptible to hay fever, the skin may show absolutely no reaction when brought in contact with the toxin. These results may be of value in the study of individual predisposition, since

they enable us to throw some light upon the question as to whether or not hay fever is to be looked upon as a result of a hypersensitiveness.

Before I take up this subject more fully, I must dispose of the older attempts to explain the hay fever predisposition. In a former monograph[1] I reviewed the literature up to 1902 very thoroughly, and cannot repeat now everything that I touched upon then. I shall only touch upon such ideas and conceptions to which I find many rhinologists and ophthalmologists still cling and which are diametrically opposed to all of my opinions. In the first place, statistics have definitely proved that hay fever has no relation to any constitutional disease—for instance, gout; that, indeed, only a very small percentage of hay fever patients are gouty. It is very commonly believed that hay fever is due to some anomaly or stopping up of the upper air passages. A local disease of the trigeminus is assumed by some, with a resulting sensitiveness on the part of certain mucous membranes. The falsity of these conceptions is clear from the experiments cited above. Not only does the whole skin surface of many patients react to the poison, but subcutaneous infection is followed by characteristic effects. By showing that the anal mucous membrane of hay fever patients reacts to the pollen toxin, I believe that all those hypotheses, which assume only a local sensitiveness on the part of the cranial nerves, or the capital mucous membranes, is robbed of all support. Suggestion, as we have seen, plays a large part in the attempts to explain hay fever predisposition. I can treat this question together with that of the rôle of specific odors of flowers, cats, dogs, etc. Two colorless, odorless solutions were prepared, and a drop from one of them was placed on the mucous membrane of the eye and nose of a large number of hay fever patients. Some reacted, others did not. None of them knew what sort of a solution was being used. The applications were then made in a different way, each patient receiving a drop of the solution which had not been used in his case before. Those who had reacted the first time did not do so the second. The one solution was physiologic salt, the other pollen albumen. None of the patients reacted to the saline, all reacted to the other solution. In the course of many years I repeated these experiments with many variations. In the place of the salt solution I used solution of

albumen from inactive pollen. The results were always the same. In the face of such results, he who would explain hay fever on the ground of suggestion, simply ignores all the facts to the contrary, and his opinion does not deserve serious consideration.

Hay fever is also looked upon as a result of an advanced culture and civilization. It happens that there are very few hay fever patients in the laboring class, and that the Anglo-Saxon races, especially the Germans, English and Americans, furnish the largest number of such patients. That hay fever does at times occur among the Romans and other nations, I am able to gather from correspondence that I have had with inhabitants of such countries. In St. Louis I met an elevator boy who had hay fever. Among the Anglo-Saxons the disease is found most often among professional men. Men appear to be twice as susceptible as women. It is often claimed that hay fever follows a period of strenuous mental work, or of excitement, as, for instance, after examination, or in officers after maneuvers. Hay fever has often been shown to be hereditary. Most frequently, however, a severe attack of influenza has left hay fever in its wake. Other causes, as, for instance, a difficult labor, are asserted by patients to have been the exciting cause of their hay fever attacks. May we conclude from all these facts that hay fever is a result of a disturbance of the central nervous system?

It was formerly believed that all hay fever patients were very nervous and excitable. This is certainly not universally true. If we are indeed dealing with a severe abnormality of the central nervous system this, in most instances, makes itself felt only in a hay fever predisposition. Hundreds of hay fever patients have written me that they are all together well except during the season, and I have found among hay fever patients many with very phlegmatic dispositions. Those idiosyncrasies which resemble hay fever in a way, as, for instance, susceptibility to strawberries, crawfish, iodin, antipyrin, bromids and the salts of quinin, are today explained on the ground of anaphylaxis. Ten years ago I suggested that the susceptibility to hay fever might be put in this class.

E. V. Behring,[6] Knorr,[7] and others had then already called attention to the fact that animals which had received a small dose of diphtheria toxin later reacted to a much smaller dose

in a very extraordinary manner. The susceptibility of tuberculous patients to the proteid of the tubercle bacillus had been recognized by Robert Koch in 1890.[8] At that time the explanation of this phenomenon was still unknown. Since then a great amount of work has been done on this subject, and today anaphylaxis holds the interest of all those who are studying experimental therapeutics. In no case of anaphylaxis are there found antibodies to the anaphylatoxin which Friedberger claims causes the phenomenon. Of further interest is the observation that by means of the blood serum of anaphylatic animals or human beings the hypersensitiveness can be conferred upon others (passive anaphylaxis). Further, after an anaphylatic shock a condition of anti-anaphylaxis results. These known facts concerning anaphylaxis must be taken into consideration before hay fever can be explained in this way.

To test the question as to passive anaphylaxis, I have injected the blood of hay fever patients intravenously into guinea pigs. Twenty-four hours later they received an intravenous injection of the albumen of the rye pollen. There were no anaphylatic symptoms. When I injected the blood serum of guinea pigs that had been repeatedly inoculated with pollen into other guinea pigs, and then administered the pollen to them, they reacted with mild convulsion of very short duration and a moderate fall in temperature (36.1° C.). These results do not seem to prove that the hay fever disposition is an anaphylatic condition. After an attack of hay fever the patient is not anti-anaphylatic. The free intervals of a few days, which sometimes occur during the attack of hay fever, are not to be explained on the grounds of antianaphylaxis, but by the fact that on rainy days that the air is free from pollen. All observers are of the opinion that hay fever patients are not rendered more resistant by having gone through one attack, but are, on the other hand, more susceptible.

One of my coworkers declares that he has used the pollen toxin experimentally more than a thousand times, and there has been no change in his susceptibility. I have made the same observation on myself after having used the toxin personally one hundred times.

All clinical observations seem to prove that there is no anti-anaphylaxis in hay fever. In this respect, therefore, the hay fever predisposition does not appear to be anaphylatic.

In a third respect hay fever differs, as we shall see, from our present day conception of anaphylaxis, for it is possible by means of the pollen albumen to produce a real antitoxin.

All of my experiences and observations speak against the explanation of hay fever on the basis of anaphylaxis. The anaphylatic hypothesis would explain hay fever as follows: In some way or other the patient has taken in a large amount of pollen albumen. He is thus sensitized, that is, rendered anaphylatic, to a later dose of the same substance. I have been able to show many times that people who live in Germany and have not visited America, who have thus never come in contact with the pollen albumen in golden rod or rag weed, have reacted after the first dose of these plants with hay fever symptoms. On the other hand, I have shown that normal individuals are not affected by a subcutaneous injection of pollen albumen, even though the injected dose was many times as large as that which they could have, and probably had, taken up in natural ways during the course of many years.

It can at least be said that our present day conception of anaphylaxis must be very much revised before it will serve to explain the disposition to hay fever.

Even if it were possible to explain the disposition to hay fever as a sensitization very much like anaphylaxis, even then we should not have arrived at a satisfactory explanation. For we cannot get around the fact that normal individuals are not rendered susceptible to hay fever toxin by the subcutaneous injection of pollen albumen. The normal individual simply does not react to this proteid toxin to which the hay fever patient is susceptible to such a marked degree. We must patiently experiment and inquire further in order to obtain an explanation of this interesting and puzzling problem. Years ago I proved that the blood serum of hay fever patients, after the hay fever period, acted differently upon the blood corpuscles of certain animals from the serum of normal people. It brought about a solution of the corpuscles of guinea pigs, rabbits and sheep. Six months later the blood serum of these patients had completely, or to a very large extent, lost its hemolytic power; when hemolysis did not occur the corpuscles were agglutinated. In the meantime, Dr. W. Gaehtganes found that the blood serum of an ape had no action on

the corpuscles of rabbits and guinea pigs, and agglutinated those of the sheep to a slight degree. Ten days after an injection of the toxin into the ape, rabbit corpuscles were strongly agglutinated, guinea pig corpuscles showed slight hemolysis, while sheep corpuscles were not affected. A control ape injected with horse serum reacted in the same way, so that the clew which we thought we had found was useless. I am convinced of the importance of continuing such experiments, because the basis for individual predisposition, it seems to me, can be experimentally explained in the case of hay fever more easily than in that of any other disease.

Thus we see that the question as to the predisposition of an individual to hay fever is not yet satisfactorily explained. The conditions are quite different when we are to decide whether a certain disease that confronts us is hay fever or not. The experiments described above on the irritant action of the pollen albumen of certain plants on the mucous membrane of hay fever patients, I used from the first for diagnostic purposes.

DIAGNOSIS OF HAY FEVER.

It has been seen that a hay fever patient reacts with certain characteristic symptoms when one drop of a 1-200,000 solution of pollen albumen is placed on a mucous surface. It has been further shown that normal individuals do not react to a 1 per cent or even more concentrated solution of the toxin. We have here a simple and sure method for the recognition of hay fever, simpler and more certain than in any other disease that I know of. By this method we can also decide whether a patient has European hay fever, the American autumnal catarrh, or is suffering from a combination of both. We can with certainty determine whether a patient has coryza nervosa or some other affection resembling hay fever. We can determine whether patients who believe that they cannot stand the odor of cats, horses, or other odors, are correct in their belief, or whether they have not true hay fever. By means of the reaction Bastian could easily have shown that it was not the ascaris lumbricoides which caused his symptoms, but hay fever, which was prevalent at the time that he demonstrated these worms.

Many unsatisfactory results with hay fever remedies could be avoided if every physician would make it his business to

make a clearcut diagnosis in every case. The firm Schimmel and Company in Miltitz is prepared to furnish to every physician, free of charge, the exact amount of toxin which he needs for a diagnosis. They furnish the toxin ready to use under the name of diagnosticum. In this connection I would call attention to the fact that the conjunctival diagnostic method (ophthalmoreaction) which is today so widely used, really took its origin in my hay fever reactions.

I also proved about ten years ago that the hay fever toxin causes inflammatory changes in some patients when placed on the intact skin.

My experiments have proved that the specific hay fever toxin is a protein substance, or at least in combination with protein. As early as ten years ago the probability of obtaining a specific antitoxin appeared very doubtful. Behring[9] had already showed by his tetanus and diphtheria work the possibility of producing antibodies to certain bacterial toxins. Ehrlich[10] had obtained antitoxins by using the toxic albumen of certain plants (abrin, ricin). The albumen of the pollen is, however, as we have seen, not a toxin in the ordinary sense of the word, for it is entirely inactive as far as most men and animals are concerned. It is only toxic for a very small percentage of mankind. Animal experimentation further proved that it does not belong to those proteins whose avidity is very great. The protein of fish eggs, for instance, shows a much greater activity as far as the formation of precipitins and hemolysins are concerned. In spite of the fact that the condition seemed unfavorable, my earliest experiments on rabbits (1902) met with unexpectedly favorable results. The blood serum of rabbits that had received repeated intravenous injections of pollen albumen possessed the power so to influence the pollen toxin in vitro that it lost its activity. I also succeeded in overcoming the symptoms caused in hay fever patients by the application of the immune serum. Finally a solution of the toxin introduced into the conjunctival sac in which immune serum had been previously used remained without action. Encouraged by these successes I began inoculating larger animals, as goats and horses. The goats did not respond to the action of the toxin, and even after long treatment yielded no antitoxin. Only one of the goats reacted to each injection with syncopal attacks and finally died after an injection in

anaphylatic shock. The horse reacted in very different ways. A large number of horses which I inoculated, ordinary farm animals, were unaffected, whereas highbred animals, race horses, showed marked reactions. I do not know whether this was altogether an accident or not. The thought suggested itself that the strenuous work and the demands made on the highbred animals might have made them more susceptible to the hay fever poison, in much the same way as our culture and civilization might have affected man. One thing appears worthy of special notice, namely, that animals which reacted to the toxin invariably did so after the first injection. Repeated injections did not make them more susceptible, but enabled them to withstand larger doses of the toxin, thirty times the ordinary dose, without any symptoms at all, while the usual initial dose at times caused such marked symptoms that the veterinary surgeon who was present predicted the death of the animal. The animal reacted with fever, sweating, and marked cramp like tremors, fatigue, poor appetite, and, what was most marked, a vesicular eruption. In some animals there was an edematous swelling at the point of injection, 50 to 75 cm. in diameter. In other cases after the first injection there was present a vesicular eruption with lesions as large as walnuts over the whole body. The same animals withstood much larger doses at later injections without any eruption at all. The assertion that horses are rendered more susceptible by pollen injection and later react to smaller doses and cannot withstand larger ones, has caused much confusion in the hay fever question. This assertion contradicts all the facts, and all hypotheses based upon it—for instance, that no specific antitoxin can be produced by the pollen—must fail. It has even been stated that immunized animals have reacted by redness of the conjunctiva when pollen albumen was applied to it. I myself have never seen such a thing.

Many rabbits and some horses are especially adapted for the production of a specific antidote to the pollen toxin, that is, an antitoxin. The presence of this substance and the degree of its activity can only be determined up to the present time by clinical methods or by a combination of experiments in vitreo and in vivo. Up to the present time I have found specific precipitins only in the blood serum of hay fever patients, and then only in very small amounts. In rabbits, after

repeated injections, I have never found any evidence of the presence of a true precipitin. Only once did I get a turbidity which, however, was not specific.[11] I must insist upon the fact that rabbits do not react with the formation of precipitins after pollen injections, in spite of what is claimed by Magnus and Friedenthal.[12] Horses, as a rule, also form no precipitins. One horse that died soon after of tetanus formed precipitins.[13]

It is interesting to note that the male sexual cells of fish and other animals, cells that correspond to the pollen of plants, do not cause the formation of precipitins.

As far as complement deviation is concerned, the conditions are also peculiar. In rabbits I obtained immune serum which bound complement completely in dilutions of 1 to 50,000. In active immune sera of horses complement was bound to only a slight extent in dilutions of 1 to 10 or 1 to 100. Sera that differ so widely in their power to deviate complement have an equal power to neutralize pollen toxin. To test the activity of a serum, therefore, neither the precipitin reaction nor the complement deviation test can be used. At best the complement deviation method is useful in the case of any one animal as a measure of the immune bodies in its serum. As I have not been able to find an animal susceptible to pollen toxin, the antitoxic action of immune serum can only be tested on patients with hay fever. In the case of these the reaction is so marked that this method is a very exact one. In testing other antitoxins their value is determined by their power to keep the animal alive, or their inability to do so. In testing pollen antitoxin the patient himself decides whether any of the subjective symptoms are absent, and he who is making the test can determine whether the conjunctiva remains unchanged or gets red. We have seen that only very small doses of the toxin are needed to cause a reaction. In most cases 0.005 mgr. of the protein of the pollen is enough to cause a conjunctivitis or even an edema. This reaction as a rule affects also the nose and results in paroxysmal attacks of sneezing. In very susceptible patients 0.000025 mgr. is enough to cause the same symptoms. These are doses that cannot be weighed with the smallest scales and reactions which the most refined chemical methods and the most active chemical substances cannot produce. A patient who has gone through many such attacks continues to react in exactly the

same way. Dr. Carl Prausnitz,[14] who has for many years been of assistance to me, at great sacrifice to himself, declared that he had done such experiments on himself thousands of times without any noticeable change in his susceptibility. In our experiments it has always been evident that the action of the toxin is purely local, for instance, that it never affects one eye when placed in the other. From the conjunctiva the poison finds its way through the lacrimal duct into the nasal passages and causes a reaction there, always on the same side. If the toxin is applied to the nasal mucosa it frequently causes a reaction in the nasopharynx and many patients experience an irritation in the deeper air passages. Under certain conditions the toxic action may proceed from the conjunctiva to the nasopharynx, but is always limited to the side corresponding to the application of the toxin.

As a result of such observations as these I have tested the antitoxic power of the immune sera in the following way: At first the degree of susceptibility of the patient was established; it was determined what minimal dose would produce subjective or objective symptoms of hay fever. Thus, for instance, if it was found that a patient did not react to a solution of 1 to 30,000, but that there was a redness of the conjunctiva as soon as one drop of a 1 to 20,000 solution was applied to it, I proceeded as follows: I mixed the solution with normal horse serum and also with the immune serum which was to be tested. The one mixture was applied to the cornea of the right eye, the other to that of the left. The mixture which contained normal horse serum was as active as a pure solution of the toxin. The mixture with immune serum caused no symptoms at all if used in proper proportion. Dr. C. Prausnitz, who was of great assistance to me in all these experiments, suggested an improvement of this method, which I accepted, and according to his method the antitoxin was tested as follows:

Twice the minimal dose of toxin solution was used. If the patient had reacted to a solution of 1 to 40,000, a toxin solution of 1 to 10,000 was prepared. If it was taken for granted that the immune serum had a strength of forty units, it was diluted twenty times. If equal parts of the toxin and serum dilution were mixed, then the toxin was presented in a dilution of 1 to 20,000 and the immune serum in a solution of 1 to 40. This

mixture was heated at 37° for thirty minutes. If the strength of the serum is really forty units, then the patient will not react with either subjective or objective symptoms. If he complains of mild itching, but there is no objective reaction, the serum has a strength of slightly less than forty units. If there is in addition to the itching a redness of the conjunctiva, the serum is tested again on a basis of a strength of thirty units.

NATURE OF THE HAY FEVER TOXIN AND ANTITOXIN.

The protein of the pollen is a toxin for the hay fever patient in the same sense that ricin, abrin and diphtheria poisons are toxins. I have never doubted the correctness of this assertion. On the other hand, it has often been claimed that the protein of the pollen is not a real toxin. This assertion is based partly upon a misunderstanding of experimental facts. It was claimed that my horses were not rendered immune by inoculation, but were made more susceptible. This assertion is, as we have seen, not true. The only objection that can be made to the claim that pollen albumen is a toxin is that the proportion between the amounts of toxin and antitoxin necessary to neutralize one another is different than in the case of diphtheria and other true toxins. This objection is, however, not valid, as Dr. O. Kammann has shown that toxin and antitoxin neutralize one another according to the law of multiple proportions. Because of the importance that has been attached to this phase of the question, I give here the results of Kammann's experiments:

Toxin and antitoxin mixed, three to four hours, 37 degrees.

Minimum dose 0.008 mg., equals one drop of toxin solution, 1 to 50,000.

Amount of Toxin	Amount of Antitoxin.	Remarks:
0.02 mg.	0.2	Neutral.
0.4	4.0	Slight irritation.
0.8	8.0	Neutral.

Kammann explains Prausnitz's contradictory results on the ground that he used too little of the toxin and allowed too little time for the complete binding of the toxin by antitoxin. It has also been claimed that pollen toxin is an endotoxin, a

substance not poisonous in itself, but harboring a toxin, and that the secretions of hay fever patients have the power to dissolve the pollen and thus set free the endotoxin. For this reason the hay fever patient is susceptible, whereas the normal individual, whose secretions do not possess the power, is not. Friedeman and Friedberger have succeeded in producing in vitreo anaphylatoxin from nontoxic material, e. g., rabbits' blood serum or sheep blood serum. By bringing together pollen albumen antitoxin and complement, according to the method of E. Friedberger, I have been able to produce a poison in vitreo that causes anaphylactic death in guinea pigs. I do not look upon this as a support for the endotoxin theory, for the poison so produced did not cause hay fever symptoms in normal individuals. I was able to prepare the same poison by using normal horse serum instead of specific antitoxin, so that the poison is in no sense a specific one. It was sufficient indeed to add normal guinea pig serum to pollen albumen to set free a substance highly toxic for guinea pigs.

C. Prausnitz has advanced the following hypothesis to explain the nature of the hay fever toxin and antitoxin: He believes that the hay fever patient possesses a comparatively smaller number of specific amboceptors, and that this in reality constitutes the hay fever predisposition. Pollen albumen when in contact with a mucous membrane is by means of the action of complement digested. An intermediate product in this process is toxic, but the digestion goes on so rapidly in normal individuals that the stage of the toxic product is very short. If amboceptor is not plentiful enough the splitting process is much slower, so that the intermediate toxic product can exert its action. My specific pollen antitoxin, according to this theory, prevents the hay fever attack by furnishing amboceptors. I cannot agree with this explanation of Prausnitz's for the following season: Pollen toxin withstands the action of heat, antitoxin does not. If now I prepare a neutral mixture, and heat it for one-half an hour at 75°, the thermolabile antitoxin is destroyed, the toxin is not. The heated mixture applied to the conjunctiva of hay fever patient for whom it was before inactive now causes the usual symptoms. The poison has, therefore, not been split up or destroyed by the antitoxin, but was only bound, and could be separated from it again in active form. As a result of these and similar

observations, I am convinced that pollen toxin and antitoxin belong to the class of true toxins and antitoxins, as, for instance, those of diphtheria. I believe that they unite with one another and act according to the same laws that govern the action of diphtheria toxin and antitoxin.

TREATMENT OF HAY FEVER.

Th. Albrecht declares that ten years ago every physician had his own theory concerning the treatment of hay fever. And I may add from my own experience that every patient also had his own method of treatment, which was, as a rule, very complicated. From my records it is very evident that many patients had ten or more hay fever remedies, which they used either separately or together. A hay fever patient takes up at once every new remedy that appears and enthusiastically recommends it to others. As a rule, he learns of the new remedy near the end of the hay fever season, and while he is using it his troubles disappear and he attributes his relief to the remedy he has been using. In the following spring he is undeceived. In this way one hay fever remedy after another is consigned to oblivion only to reappear later under a different name. The only remedies that have survived for any length of time are those with narcotic effects, as cocain, adrenalin, anesthesin, morphin, etc. Concerning the danger connected with the use of these narcotics, it is surely not necessary to say a word. In addition, adrenalin and anesthesin and the remedies prepared from them cause in many cases a sensation that is much more annoying and unpleasant than hay fever itself. I, myself, have tested all the hay fever remedies on which I could lay my hands within the last ten years. With no one of them did I accomplish a beneficial result. There was indeed no reason to suppose that the remedy could accomplish the things that were claimed for it. It is easy to gather the same opinion if one reads the thousands or more hay fever histories that I have in my possession. I have called attention above to the fact that on purely theoretical grounds nothing was to be expected from these preparations, and that chance had not put into our hands a chemical preparation that was effective. Every physician must warn his patients against the use of narcotics. I shall, therefore, not consider those remedies and methods of treatment that belong in this category.

In the thousands or more histories which I have been able to read, cauterization, burning, chiseling, and sawing in the nose play a large part.

Without exception it is learned from the histories that these painful operations were of no avail. About ten years ago C. Zarnike declared that all these useless operations would be given up as soon as we possessed a specific remedy. This conclusion is logical and clear, and yet hay fever patients are today operated on almost as frequently as before.

It has been shown above that the active albumen pollen is a substance of such marked specificity that the albumen which causes hay fever symptoms in one patient (pollen of the grasses in Europeans) is entirely inactive in other patients (those with autumnal catarrh). On the other hand, the toxin of the rag weed has absolutely no effect on European patients. By means of the complement deviation method I could prove that this specificity could be shown in the hemolytic properties of the different albumens, the albumen of the grass pollen reacting altogether differently than that of golden rod and rag weed. In view of this state of affairs, it is not to be hoped that chance would furnish us a chemical substance that would either neutralize or render inactive the pollen albumen, or overcome the individual predisposition, which, as we have seen, is also strictly specific. I have come to the conclusion that we can accomplish our end in three ways only.

First, by finding localities where the specific cause does not occur; second, by protecting the eyes, nose and mouth of the patient from the pollen; third, by active immunization against the toxin, or the use of a specific antitoxin.

The first method is yearly employed by many patients with success. The second method is also successful. Hay fever patients are free from symptoms in regions in which a specific pollen does not occur. This was to be expected from what we have learned about the cause of the disease. Thus many patients find relief on the seashore, in islands, and in barren mountainous districts. In Germany they go to Heligoland. In the United States they retire to Fire Island, Long Beach, White Mountains, Green Mountains, or Adirondack Mountains during the hay fever season.

Many masks or filters which the patients are to place in the anterior nares have been recommended. Verworm has rec-

ommended rubbing the nasal mucosa with bormelin and then introducing a plug of cotton. He himself was able to ward off hay fever in this way. The important feature is the cotton, which arrests the pollen, for it has been shown that all non-specific salves are useless. The masks and filters have not become popular. Most patients find them uncomfortable and troublesome. Both these methods can at best ward off an attack, in no sense do they bring about a definite cure.

Soon after beginning my experiments I realized that it was useless to attempt to bring about an active immunity. If this were possible, all patients would in the course of their annual attacks become immunized. That the human organism would react with the formation of antibodies to the toxin introduced directly into the circulation, although it did not do so to the toxin introduced in the usual way, appeared improbable after I had proved that the pollen toxin does indeed enter the circulation from the cutis or mucosa in the form of an albumen. Robert Koch, who was very much interested in my studies, repeatedly advised me to attempt active immunization, beginning with very small doses. The attempt has been made to lessen the susceptibility of the conjunctiva by gradually increasing does of the toxin. This has also met with failure.

Recently attempts to actively immunize hay fever patients have been made in the laboratory of Sir A. E. Wright by L. Noon. A number of hay fever patients received gradually increasing doses of pollen extract at intervals of from three to fourteen days. During the course of the treatment, the susceptibility of the conjunctiva was reduced. If too large doses of the toxin were used the susceptibility increased temporarily (negative phase). It was possible to reduce the susceptibility to 1/100 of what it had originally been. At this point it was so low that many patients were rendered insusceptible to such doses of the pollen toxin as they are ordinarily exposed to. Continuing the experiments of Noon, Freeman treated twenty patients, and found it possible to reduce the susceptibility of the conjunctiva to 1/10 or 1/100 of what it had originally been. In thirty-seven cases the results were satisfactory, thirteen were much improved, two showed no effect. The degree to which the conjunctival susceptibility is reduced is some measure of the clinical result to be expected. It cannot at present be definitely decided whether these results are due to

a real active immunization or to the production of the condition of antianaphylaxis. I personally believe that this immunity will not be lasting. A permanent immunity will only be possible by a mixed immunization, by treatment with both toxin and antitoxin. During the hay fever season by the use of the specific antitoxin, this is practically the method employed, as the patient is daily exposed to the toxin. A number of patients have in reality been rendered permanently immune by the use of the antitoxin. In the majority of cases this has not been so. Perhaps a systematic combination of active and passive immunization would yield a larger number of successful results. I have begun a number of such experiments.

Shortly after the specific antitoxin was introduced another serum was put on the market under the name of graminol. It was asserted that ruminants, for instance cows, furnished an active blood serum during the hay fever season. This idea, which furnishes the theoretic basis for graminol, has been shown to be false by O. Kammann and C. Prausnitz. They have shown that pollen albumen does not enter the circulation from the intestinal tract, and can, therefore, produce no antitoxin. Graminol itself has been shown to possess absolutely no antitoxic action. A certain number of patients have claimed that they have been helped by graminol. Hoffmann has called attention to the fact that the preparation of graminol is an industrial secret and has suggested that it may contain adrenalin. Those who have claimed much virtue for graminol have attempted to deny that pollen albumen is a toxin. This theory must today be considered as without foundation and requires no further attention at my hands.

The specific antitoxin is on the market under the name of pollantin—more accurately, pollantin liquidum—composed of antitoxic horse serum plus one-fourth per cent phenol. This liquid preparation deteriorates easily, and is disagreeable to many patients because of its phenol odor. For these reasons pollantin has been prepared as a powder. The antitoxic horse serum is dried in vacuo and pulverized. It is then stable without the addition of any preservative, but irritates the mucous membrane. Very finely pulverized milk sugar has been added to the powdered serum and robs it of its irritating effect. Recently a third preparation, pollantin R, has been prepared for such patients who are anaphylactic to horse serum. At the re-

quest of many physicians, pollantin is now furnished in the form of a salve, and I have also had made pastilles which many patients have used with success to combat the asthmatic symptoms of hay fever.

The method of using these preparations is very simple. The preparation, in whatever form it may be used, is applied in small amounts to the mucous surfaces of the eye, nose or mouth before any of the phenomena of hay fever have appeared. Many patients do not observe these rules. After the mucous membranes are already inflamed and edematous, they no longer absorb the antitoxin. The antitoxin can only be used locally. The subcutaneous or intravenous use produces results, at best, for only a very few days. Its repeated injection carries with it the danger of serum anaphylaxis. Many hay fever patients almost invariably use the pollatin in doses that are much too large. I have always insisted that only the very smallest amounts are to be used. The antitoxic effect of the preparation is so marked that a minimum amount of the powder is sufficient to neutralize all the toxin which the patient may take up in the course of a day. If the doses used are too large, many patients soon become hypersensitized. As early as 1905 some patients showed the phenomenon of horse serum anaphylaxis. At that time our knowledge of anaphylaxis was not very broad. I showed, however, at that time that the irritating effect of pollantin had nothing to do with the antitoxin in the serum. For the same patients reacted in the same way when normal horse serum alone was applied to their mucous membrane. I have also observed that hay fever patients could be rendered anaphylactic against horse serum by its application to their conjunctiva, so that if a drop of serum was placed on the intact skin, it reacted with itching, burning, and erythema. The action of normal horse serum on the skin is in these cases identical with that of the pollen toxin. In anaphylatic individuals horse serum affects the conjunctiva and nasal mucous membrane just as the pollen toxin does. Many patients have written me that the antitoxin seems to favor the hay fever attack instead of preventing it. When normal horse serum was used in these cases, I have been informed that the serum also caused hay fever attacks.

Serum anaphylaxis does not in reality occur as often in hay fever patients as I had been led to believe from my correspond-

ents. An inquiry as to the matter showed that a large percentage of patients annually used pollantin without the slightest unpleasant symptoms. Thousands of hay fever patients would not use the antitoxin continually if it caused anaphylactic symptoms. Hay fever patients are much too impatient to expect this.

All my attempts of many years to get rid of the irritating contents of the horse serum have been in vain. As early as 1905, I realized that this would be so, for I proved then that the irritating substance (as I then called the anaphylactic agent) was bound to the euglobulin of the horse serum as was also the antitoxin itself. If the euglobulin is destroyed the antitoxin is at the same time rendered useless. I have been able to help patients who have become anaphylactic in two ways: First, by the use of pollantin R., and the suggestion to use this diluted serum only before the occurrence of the hay fever attack, in the very smallest doses, and if possible only once daily. Patients who follow these directions have informed me that pollantin R. did not irritate them at first, although it did so later. The irritation was, however, not severe and disappeared within ten to thirty minutes. After this the patient was free from hay fever attacks for one or more days. Secondly, I have taken advantage of the fact that horse serum anaphylaxis is in most cases specific, but does not appear to me to be always so. I have seen instances in which during the development of a hypersensitiveness to one animal serum, patients were rendered anaphylactic to the sera of other animals also. This does not, however, happen often. I have, therefore, administered to patients who could no longer stand pollantin R. a very active rabbit serum with good results. It was not only possible to ward off attacks with this serum, but also to protect patients from further attacks during the hay fever season. These results appear to me to support the opinion, which I expressed years ago, viz., that the reaction to the antitoxin, and with it the tendency toward definite immunization, is directly proportional to the degree to which anaphylaxis toward animal serum develops. Patients who have become anaphylactic get along with much smaller doses of antitoxin than other patients, and have, I believe, a better chance to effectually overcome their hay fever predisposition.

This is the goal toward which we must strive. I know of

many hay fever patients, some of whom had attacks of the worst kind, who were entirely free after the use of pollantin for a very short time. I consider these people permanently cured, and so expressed myself in an article last year. A rhinologist interested in hay fever wrote to me that he could not understand these successes, and that he and his colleague had never been able to obtain such results. He wrote further that my successful experiences were in marked contrast to the experienced German Hay Fever Association. In answer to such communications I have placed my material in the hands of the secretary of this association, Dr. Th. Albrecht. I was very much pleased to learn as a result that Dr. Albrecht had been able to cure and successfully immunize patients by means of pollantin. In a recent publication, Dr. Albrecht reported twelve cases in which, after the use of pollantin for a short time, there resulted either a complete cure or at least a marked improvement. These observations are, of course, of intense interest to me. I would ask all colleagues who have made similar observations to be kind enough to communicate them to me. I have only been strengthened in my former opinion that by means of a mixed passive and active immunization a permanent cure of hay fever can be accomplished.

Preparations for a systematic study of this question have been made, and Dr. Albrecht has kindly offered me his assistance in this work.

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XIII.

REPORT OF A CASE OF SEQUESTRUM OF THE SEMICIRCULAR CANALS, WITH PRESENTATION OF SPECIMEN.*

By Edmund Prince Fowler, M. D.,

New York.

Mary E., 45 years old, housewife, applied for treatment at the Manhattan Eye, Ear and Throat Hospital, Dr. Wendell Phillips' clinic, on February 18th, 1911.

She gave a history of grippe, followed by pain, deafness and discharge in the right ear. The discharge had persisted for three months, the pain had disappeared, but two weeks prior to admission dizziness appeared and increased to such an extent that at times she could not stand upright.

Vertigo was much worse for the three days preceding admission, and it was this symptom which brought her to the hospital. She stated that she felt as though she was falling to the right.

Examination showed a very tender and edematous mastoid process, and marked nystagmus to both sides, combined horizontal and rotary. The nystagmus was so excessive that it was impossible to determine its direction, and it was diagnosed by several men as an ocular nystagmus. While the eyes were closed dizziness was markedly lessened.

Unfortunately the history charts in this case were lost, but I can clearly remember the clinical picture.

An extensive mastoidectomy was done, the whole tip and much of the posterior wall removed. Two days later all nystagmus and vertigo disappeared, and to date have not reappeared. The wound was treated in the usual way, and the patient discharged from the hospital on the eleventh day.

The patient made a satisfactory recovery except that the

*Read before the New York Academy of Medicine, Section on Otology, December 8, 1911.

wound continued to discharge, at first profusely, and later moderately, until the second operation. Three months after the primary operation a complete facial paralysis occurred, and this lasted for three or four days, since which time the patient has suffered no inconvenience from her trouble except the deafness and the discharge from the old wound sinus.

On November 18th a secondary operation was decided upon. An examination of the urine on admission showed marked albuminuria and glycosuria. Bare bone could be felt by probing the middle ear through the wound. The external auditory canal was dry.

Functional tests were not definite, but Weber lateralized the sound in the better ear. It was thought that the patient possessed some hearing in the diseased ear. This was probably not the case.

Operation showed the old wound completely epidermatized down to the aditus, which was filled with granulations. The inner posterior portion of the external auditory canal was necrotic. The remainder of the mastoid process showed nothing of interest.

When the bony external semicircular canal was clearly exposed it showed an opening into its lumen, and this with the fact that it was movable gave it an appearance which simulated a posterior displacement of the incus. After removing the remains of the posterior meatal and external aditus walls it was apparent that the external semicircular canal was separated from the temporal bone. Careful curetting around the sequestrum revealed a large mass, and in order to secure sufficient room to remove this without destroying the facial nerve a portion of the tegmen antri and tympani was ablated. A portion of the vestibule with the three semicircular canals was removed intact, with the exception of about one-quarter of the exterior and anterior part of the horizontal, and a small piece of the anterior extremity of the sagittal canal. The fallopian canal was necrotic in the middle ear, and slight pressure upon it caused muscular twitching on the right side of the face.

The bottom of the wound now presenting was covered with granulations, and it was deemed wise to leave these in situ. The wound was packed with iodoform gauze. Upon regaining consciousness the patient showed a complete facial paralysis on her right side.

Since the operation the albuminuria has cleared up, and there has been some return of power in the right upper eyelid. The patient states that she feels a little response on endeavoring to contract the paralyzed facial muscles.

If all goes well, as now seems probable, the posterior wound will be closed, and the operative procedures completed.

There is complete loss of hearing in the right ear, but for a few days following the operation tinnitus was complained of. This was increased whenever the head was congested.

Caloric and rotation tests show a normal left semicircular canal system and no response from the right side.

The blood counts and temperature charts are of no special interest.

In this case there is little doubt that the diabetes was the determining factor in the carious process, and it behooves one to make it a rule to ascertain the presence or absence of diabetes, to the end that appropriate measures may be instituted to lessen its influence on the general and special economy.

It is seldom possible to show a sequestrum of the three semicircular canals as intact as the one obtained from this case.

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XIV.

THE BLOOD SUPPLY OF THE INTERNAL EAR OF THE PIGEON.

By D. B. Hayden, M. D.,

Chicago.

A brief description of the anatomy of the ear of the pigeon will aid in understanding the blood supply of that organ. The internal ear is similar to that of most birds. It possesses three semicircular canals. The superior, the largest, is of the erect type, its anterior curve being almost angular, while the posterior limb communicates with the posterior crus of the posterior canal. The posterior canal is the smallest. The horizontal canal dips slightly downward at the point where it passes beneath the posterior. Gray describes the existence of a "communication between the horizontal and posterior canals where the former passes beneath the latter. The communication exists only between the perilymph spaces of the canals." In the pigeon there is no communication posteriorly between the superior and horizontal canals.

A well defined perilymph space is found in the canals. The perilymph recess is fairly large and lies posterior to the base of the cochlea. Emerging from the inner wall of this recess is the aqueductus cochleæ. The vestibule in comparison is very small. The cochlea is tube shaped, with its convex surface directed downward and forward. At its inner end is the lagena, in which is found a mass of neuroepithelium and otoliths.

Specimens for the study of the blood vessels were prepared as follows: The domestic or rock pigeons were chloroformed, an opening made in the thorax, the heart exposed and opened. After thoroughly washing out the blood with a normal saline solution, a saturated solution of Prussian blue was injected into the aorta from a height of about three feet. In a few cases a small canula was inserted into the external carotid.

The heads of the birds were then removed and placed in a 10 per cent formalin solution for twenty-four hours. The labyrinths were then removed and placed in increasing strengths of alcohol, imbedded in 20 per cent celloidin, and decalcified in a 1 per cent nitric acid and 75 per cent alcohol solution. The celloidin and decalcified bone was then carefully picked away, and the preparation cleared in creasote and xylol and mounted in balsam. Examination under the binocular microscope shows the following arrangement of vessels: The labyrinthine artery enters through the meatus acusticus internus and immediately divides into an anterior and posterior division. From the anterior a ramus goes to supply the anterior crus of the superior and another ramus to the utricle and saccule. From the posterior division of the labyrinthine artery is given off a branch, which goes to the crus commune, and this later subdivides into two branches, one to the anterior crus of the superior, and another ramus to the posterior crus of the superior canal. Also from the posterior division several small branches are given off which go to supply the utricle and saccule, and one large branch (cochlear), which goes to supply the cochlea. From the cochlear artery numerous transverse branches are given off, which anastomose freely on the superior surface of the cochlea. This corresponds to the stria vascularis. The veins for the canals accompany the arteries. In the cochlea the vein passes along the anterior surface and, looping over above the vestibule, receives branches from the utricle and saccule, passing out through the aqueductus cochlea. Several small veins and arteries pass out to the very edge of the bony labyrinth, but none could be traced that communicated with the sinuses that surrounded it. A small vein is seen given off posteriorly in all specimens at the region of the lagena.

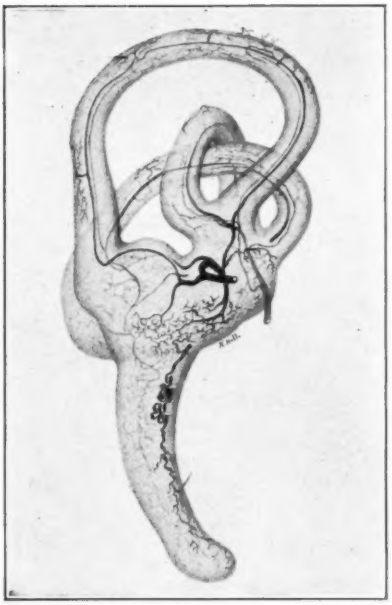

FIGURE I.

Right labyrinth, viewed from within. Arteries darker than veins.

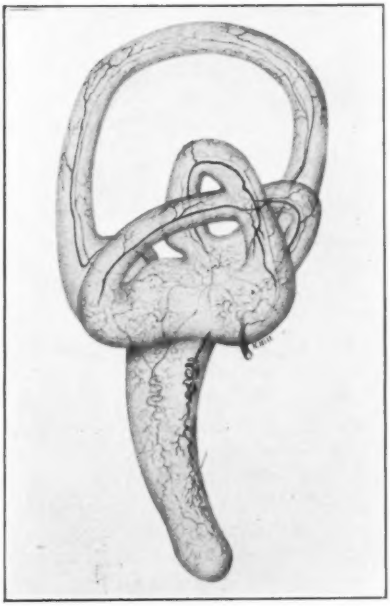

FIGURE II.

Left labyrinth, viewed from without. Arteries darker than veins.

XV.

CEREBELLAR ABSCESS OF OTITIC ORIGIN, WITH REPORT OF A CASE.

By Frank R. Spencer, A. B., M. D.,

Boulder, Colorado.

It is now a well known fact that a brain abscess complicating chronic purulent otitis media may remain latent for years and then suddenly become manifest as a result of an acute exacerbation of the otitis media. The case reported is a good example of this.

Neither acute nor chronic otitis media can be considered a trivial disease, because of the danger from intracranial complications. Many of these cases are first seen by general practitioners, but I am glad to say they usually recognize the gravity of such diseases early. However, the writer does not feel that the reporting of a single case will add very much to our present knowledge on this subject, especially since many colleagues have been able to report an extensive series of cases, but he does hope to report each and every case which may be of any value.

The case under consideration was observed before I had an opportunity to study diseases of the internal ear in Vienna, so that the data concerning the labyrinthine symptoms are necessarily meager, although, in all probability, the patient had labyrinthitis at one time in the course of his disease.

Case.—Mr. A., age 19, university student, came to the office January 13, 1910, complaining of deep seated, severe, excruciating pain in the left ear. This pain began two days previously and had steadily increased in severity. He gave a history of chronic otitis media, with constant purulent discharge, which had lasted since he had scarlet fever at three years of age. At times during the past two years he had

suffered from slight pain in the ear, but it had never been so severe as it was at this time. The only treatment his ear had received was such as he could administer himself.

Examination.—The left meatus was filled with pus, but after wiping this away the drum was found to be red and bulging with a very large perforation in the anterior inferior quadrant. A perforation at this point usually does not indicate extensive middle ear disease. Granulation tissue covered the internal wall of the middle ear, and the mastoid was tender. The right ear was negative. As the drainage was defective, a free incision was made in the left ear drum. In spite of the incision the patient's condition failed to improve, and as he steadily grew worse it became necessary to send him to the hospital for observation and treatment on January 17, 1910. All efforts to abort the mastoiditis were without avail, and on January 19th a simple mastoid operation was performed. A large mastoid process was exposed, and as the necrosis was extensive the lateral sinus was uncovered during the course of the operation. The wall of the sinus was bulging, grayish yellow, and pulsation was absent—in other words, a septic thrombus was present. The exposed wall of the sinus was freely incised, and the thrombus removed with a dull curette. We secured a free return flow from above, but were unable to get a return flow from below. We decided not to ligate the internal jugular vein at this time, but to do so later if necessary. (I know now that the internal jugular vein should have been ligated, as this would have been the usual procedure at least, but even this would in all probability not have prevented the fatal termination.)

During the course of the operation a very decided fecal odor came from the pus, which Dr. Burnett attributed to the action of the paracolon bacillus. The wound was packed in the usual manner when the lateral sinus has been opened, and healing was uneventful. Exactly three weeks from the date of the operation the patient was discharged from the hospital. At this time the healing of the mastoid wound was well advanced and his complete recovery seemed certain. The author was assisted at the operation by Dr. L. M. Giffin.

Four days later the patient came to the office with deep, severe, boring, constant, excruciating pain in the left side of the head, which morphin did not relieve. He was sent back

to the hospital for observation and, if necessary, another operation. Examination of the mastoid wound failed to reveal anything to account for the pain, nor was it expected that it would. Repeated examinations of the fundi were negative. The pain was generally diffuse and usually, though not always, confined to the left side of the head. The pain was always referred to the temporosphenoidal region and not to the occipital. On several occasions the patient complained of just as severe pain on the right side. Convulsions, strabismus, opisthotonos, nystagmus, muscular contractions, dilatation or contraction of the pupils, localized paresis or paralysis, hemiplegia, aphasia, agraphia, etc., were all absent, although the patient suffered from severe vertigo and, occasionally, from vomiting without nausea. It was, therefore, evident that neither the nuclei of origin of the cranial nerves nor their motor tracts were being pressed upon by the abscess. The patient was very drowsy; he talked rationally when aroused, but immediately returned to his former stupor. He refused all nourishment and, as just stated, had occasional vomiting without nausea. When questioned closely he insisted that the occipital region was free from pain, but that his neck was stiff. His emaciation was rapid; in fact, more so than could be accounted for by his failure to take nourishment, and his skin was sallow.

At this time the patient was seen in consultation by Drs. L. M. Giffin, Clay Giffin, George F. Neuhaus, G. H. Cattermole and C. T. Burnett. A positive diagnosis of brain abscess was made, with probable location in the temporosphenoidal lobe. I wish to emphasize, at this point, that the localizing symptoms were not definite enough to enable us to make a positive diagnosis as to the location of the abscess. As his condition was constantly growing worse, an exploratory operation was deemed advisable and was duly performed February 16, 1910. The skull was trephined at three points: 1. Above the auricle over the possible location of a temporosphenoidal abscess. 2. Just above and a little behind the knee of the lateral sinus. 3. In the anterior cerebellar region. A small trochar and canula were used to explore the brain, but no pus was found. Punctures were made in different directions through all the three trephine openings and extended from one to two inches into the substance of the brain. The three trephine openings

were packed with narrow strips of gauze, and the skin flap replaced. The author was assisted by Drs. L. M. Giffin and Clay Giffin. After the exploratory operation the patient failed rapidly, and died Monday morning, February 21st, at two o'clock, or on the fourth day after the operation.

Bacteriologic Examination.—The pus was examined bacteriologically by Dr. C. T. Burnett, professor of bacteriology at the University of Colorado, and his report is as follows: "Regarding the findings in the case referred: I made cultures on the patient's first visit to the office on January 16th, from the discharge in the external canal, and from these obtained the pneumococcus and a germ which I later determined was one of the paracolon group. At the operation, from the first pus encountered after opening the mastoid cells, I found the same two organisms, both in the cultures and in the stains of the pus. Later, on opening the lateral sinus, I obtained both in the cultures and in the stains of the pus. At autopsy we first opened the broken down tissue in the temporosphenoidal lobe. From this region I was unable to obtain cultures, but in my stains I found a Gram positive lance shaped diplococcus, which was, in all probability, a pneumococcus, and also a bacillus which corresponded to the paracolon found in previous cultures. There was, undoubtedly, some contamination in these, although considerable care was taken. From the cerebellar abscess I failed to get cultures, but I found an abundance of Gram positive diplococci, which were undoubtedly pneumococci in the pus. No bacilli were demonstrated in this abscess."

As Dr. Burnett mentioned in his report, Gram positive cocci were found in the pus from the middle ear, mastoid and lateral sinus. Neumann states that "the meningococcus of Weichselbaum, the diplococcus of Fränkel-Weichselbaum, and Friedländer's pneumococcus are often present in addition to the usual pyogenic cocci."[1]

In regard to the reaction of the brain tissue to these bacteria, the following from Neumann's monograph is of interest:

"The characteristic peculiarity of diplococci, which consists in causing an abundant secretion of fibrin in the blood, is especially prominent in cerebral abscesses produced by these organisms. Within a short time after their entrance into the brain substance, the zone of the brain tissue limiting the focus

of suppuration is enclosed by a more or less thick fibrinous structure, the meshes of which contain numerous polynuclear leucocytes. In the course of further development the fibrinous membrane, which is at first delicate, increases in thickness and consistence, until it is finally transformed into a thick, indurated abscess membrane. The cocci manifest this fibrinoplastic power, though to less extent, even when their virulence is decreased. Especially in those cases where there are marked demarcation and encapsulation processes in the neighborhood of the abscess, we have chiefly to deal with the diplococci. If the latter are associated with other bacteria, the final result depends upon the preponderating virulence of the one or other of the species of microorganism. When the abscess is induced by Gram negative anaerobic bacilli, an entirely different anatomic picture is exhibited. (Our knowledge of these anaerobic bacilli we owe to the valuable work of Ghon, *Centralb. f. Bakt.*, etc., Bd. 41, 1906, and *Beiträge zur Kenntniss der anäroben Bakterien des Menschen*, by Prof. Dr. A. Ghon, Dr. v. Mucha, and Dr. R. Müller.)[9] Instead of a definite membrane, the abscess has soft necrotic margins, is sharply defined from the surrounding brain substance, and contains semifluid necrotic masses and breaking down detritus. These bacteria are principally found on the margins of the encephalitic focus and are extra- or intracellular."[1]

"As regards the origin of these anaerobic bacilli, they flourish as harmless saprophytes in the buccal cavity, and find their way into the cavum tympani by way of the eustachian tube. The circumstances under which these microbes acquire a pathogenic power are not yet definitely understood. They certainly exhibit considerable variety in form, though their primary shape resembles that of the influenza bacillus. They are frequently ovoid, with rounded extremities and protruding sides, and no constant position as regards one another has been recognized. Occasionally they assume the form of the diplobacilli. A special characteristic of these bacilli is that they maintain their shape for a considerable period. The reaction of the nutrient medium, as well as the temperature, appears to exert no influence on the cultures. The staining is often bipolar, especially if preparations from young cultures are fixed in alcohol and stained by borax-methylene-blue solution. They are immotile and show no flagellæ or spores.

There is no definite capsule, though Lugol's stain gives a well marked outline. These obligatory anaerobic bacteria possess the power of forming, amongst other products, abundant sulphuretted hydrogen. The intensely fetid stench which proceeds from concentrated cultures of them is also found in the abscesses induced by these anaerobes. If the bacteriologic investigation of a fetid cerebral abscess shows such numerous species of bacteria, one may, notwithstanding, always demonstrate the presence of these anaerobic bacilli in cultures. Whilst the cultures of the other microbes found in the abscess pus have no special smell, those of the anaerobes have a penetrating fetor similar to the pus of a brain abscess. The fetid stench which is present in association with many brain abscesses may invariably be attributed to the presence of anaerobic bacilli. An essential characteristic of such abscesses is their feeble tendency to heal, and the profuse secretion of thin fluid pus, of a dirty gray color and mixed with abundant shreds of necrotic tissue. In my earlier days I had an opportunity of operating upon an abscess of the temporal lobe, which presented all the pathognomonic signs of such an anaerobic abscess. Neither the free application of hydrogen peroxid nor irrigations with permanganate of potash were successful in controlling the profuse secretion, and the abscess cavity did not show the slightest inclination to heal. In addition the secretion was intensely fetid in character. On bacteriologic investigation, a pure culture was obtained of these anaerobic bacilli. It is worthy of note that all animals are refractory to these microbes. It is difficult to say in what way they become pathogenic. Possibly the cholesteatoma of the middle ear may be the elective nutrient medium, acting in association with the deficiency or failure of the supply of oxygen and thus producing the activity of these bacilli."[1]

The autopsy, which was made by Dr. Ross C. Whitman, showed the following: "Clinical diagnosis: brain abscess. Pathologic diagnosis: chronic abscess of left cerebellar hemisphere; surgical wound with three trephine openings in the left temporal bone; edema of scalp about wound; subdural hemorrhage about wound; laceration and softening, left temporal cortex, resulting from operation."

"The brain only was examined. The body is that of a well nourished, well developed youth. Body heat was absent.

Rigor mortis is present. Hypostasis present in pendant parts. There is no postmortem decomposition. The entire scalp had been shaved. Beginning over the left ear and continued in a semicircular direction to the tip of the left mastoid is a surgical wound closed by sutures; the opening measures 7½ cm. The skin in the neighborhood of the wound, as far as the vertex, is slightly purple in color, and pits on pressure. On removing the sutures three trephine openings, 1 cm. in diameter, are found distributed at about equal distances in the course of the wound."

"On incising the scalp a serous fluid follows the knife to the left of the vertex. In the left parietal region the edema is more marked, and, at this point, the periosteum is slightly raised in a circular area about 4 cm. in diameter, by the fluid, which at this point is slightly opaque and grayish. The overlying temporal muscle is infiltrated with a similar material."

"On removing the calvarium, which is normal, and incising the dura, a thin clot of blood is found attached to the inner surface, densest in the region opposite the mastoid and extending in all directions with gradual thinning. It reached forward to a point somewhat in front of the tip of the temporal lobe, posteriorly nearly to the middle line and upward nearly to the vertex. The underlying pia is rather deeply congested and edematous, especially posterior to the mastoid and in the neighborhood of the Sylvian fissure."

"Two cm. from the tip of the left temporal lobe is an area lying opposite to the most anterior of the trephine openings, in which the cortical substance is lacerated and disorganized. On opening the brain, clotted blood is found in the left ventricle. This clot is most dense and extensive in the descending horn, opposite the lacerated area. There is in the region no evidence of past or present suppuration."

"The inferior surface of the left cerebellar hemisphere, however, shows in the sulci streaks of yellow purulent material, showing through the edematous pia. The entire left hemisphere is somewhat enlarged, in a symmetrical manner. An incision in the long diameter of the hemisphere, in its central part, divided equally an abscess cavity, measuring 4 cm. laterally, 3 cm. anteroposteriorly, and 1½ to 2 cm. in the vertical direction; the floor of the abscess lies from 3 to 5 cm. above the inferior surface of the hemisphere; the lobus biventralis

and the lobus gracilis are apparently replaced in their entire extent by the cavity and its limiting membranes. It is filled with a thick yellow pus, and is surrounded by a clearly defined pyogenic membrane, one-half mm. in thickness. The structures obliterated by the abscess are especially the gray matter of the cerebellum, the white matter apparently passing around its upper and inner side."

"It is not possible to trace any connection of the abscess with the sinuses, the mastoid bone, or the inner ear."

"The histologic examination of the edge of the abscess shows only a characteristic pyogenic membrane, which is, however, characterized by the absence of the fully developed granulation tissue. We find instead the granular layer of the cerebellar tissue merging gradually into the embryonic connective tissue, rich in fibroblasts with an intervening granular and, in places, fibrillary intercellular substance. The fibrils are seen to be continuous with the large spindle shaped fibroblasts. The capillaries are large and consist only of a layer of endothelial cells. Next to the abscess cavity is a layer consisting simply of pus cells and granular detritus. Many of the polynuclear cells in the pus are eosinophils. Sections stained to demonstrate bacteria by Gram's method do not reveal any organisms in the pus at the edge of the abscess. Just at the edge of the granulation tissue, nearest to the cerebellar substance, one occasionally finds within the blood vessels shreds of fibrin, and here and there, in small numbers, a small organism arranged in pairs and lance shaped, which is undoubtedly the pneumococcus. In the fold of the pia, extending into the dip of the cerebellar substance found next the abscess cavity, there is encountered a fairly abundant deposit of granular and thready fibrin, and an extremely small number of organisms, similar to those described above."

"It is greatly to be regretted that the path of infection from the ear could not be traced. This very fact, however, together with the fact that the primary process was deep seated, renders it extremely probable that the process was, in the first place, embolic in character."

As an afterthought it seems to the author that several things might have been done to better advantage: 1. I believe a radical mastoid operation was indicated in spite of the acute symptoms, because a more extensive primary operation might have

deferred the fatal termination. 2. An exploratory operation, for the evacuation of the abscess, would probably have been more successful had it been performed earlier, as the patient's condition was extremely critical at the time of the second operation. 3. A more thorough exploration of the cerebellum might have evacuated the chronic abscess.

Neumann in his recent excellent monograph on cerebellar abscess has probably given the best account of this disease which has been written to date. He gives a complete review of the bibliography since 1900, with detailed statistics from many of the leading European clinics. I have quoted extensively from his book in this paper.

According to Koch, Okada, Körner, Heinman and Neumann, cerebellar abscess is most common between the ages of ten and thirty, and males are more frequently affected than females, in the proportion of two to one. The fact that twice as many males as females are affected is probably to be explained by the greater exposure the former are subjected to, especially among the lower classes. The left side of the brain is involved more frequently than the right, although the difference is by no means marked.[3]

The cerebellar abscess was due to chronic purulent otitis media in 80 to 88 per cent of the cases, and to acute in 12 to 20 per cent. From Neumann's own collection of 132 cases (88 per cent) were chronic and 19 (12 per cent) were acute.

Brain abscesses may or may not be surrounded by a pyogenic membrane. Heszler (Schwartze's Handbook, 11) reports in his earlier statistics that cerebellar abscesses due to chronic middle ear suppuration are encapsulated in 65 per cent of the cases, and those due to acute otitis in 38½ per cent.[4]

"The clinical picture of the cerebellar abscess shows but few definite characteristics, so that the establishment of a uniform syndrome for otitic cerebellar abscesses presents greater difficulty. The parts of the brain surrounding the abscess, as a rule, experience encephalitic or edematous saturation, and the symptoms of irritation and motor (or disturbances of equilibrium) symptoms set up by the last mentioned alterations interfere with the clinical picture to a considerable extent. Owing to this there are symptoms of increase of cerebral pressure, which in many cases can scarcely be distinguished from those of the cerebellar abscess."[1]

"As opposed to the cases with an overplus of symptoms, a not inconsiderable number of cerebellar abscesses run an entirely latent course. According to Neumann's statistics, the cases exhibiting no symptoms amount to 94 per cent, so that cerebellar abscesses run a latent course far more frequently than all other varieties of brain abscess."

"The focal symptoms of disease of the cerebellum, and, therefore, those of cerebellar abscess, are due on the one hand to lesion of Deiters' nucleus and the afferent and efferent tracts, and on the other hand to lesion of the sensory tracts, which belong to the same side of the body and stand in relation to the coordination of muscular sense. The lesion of Deiters' nucleus produces vestibular ataxia; that of the sensory tracts results in hemiparesis and hemiataxia of the upper and lower extremities on the same side, without loss of conscious sensibility."[1]

Bárány ("Researches on the Rhythmic Nystagmus Reflected from the Vestibular Apparatus of the Ear and Its Accompanying Symptoms." *Monats. für Ohrenheilkunde,* 1906) has emphasized the importance of differential diagnosis between labyrinthitis and cerebellar abscess when the cases are seen early enough. He makes the following statement concerning some of the important signs: "Nystagmus due to disease of the labyrinth is, when the disease is circumscribed, at first directed toward the affected side; if the labyrinthine disease progresses and involves loss of excitability of the vestibular apparatus, the direction of the nystagmus changes. It then inclines toward the sound side, and so continues until the diseased labyrinth is completely destroyed. It then gradually decreases in intensity, until after a short time it entirely disappears. If my labyrinthine operation is performed, by which the whole of the labyrinth is removed, whilst nystagmus towards the sound side persists, on the first day the nystagmus is unaffected, but in two or three days its severity is materially diminished, and subsequently it rapidly disappears altogether."[2]

"The nystagmus seen in association with the endocranial complications, as opposed to the labyrinthine form, first appears in the advanced stages of the pathologic process."[2]

"The ataxia associated with cerebellar disease requires a special description. According to Bárány's view, this is a combination of a vestibular and a specifically cerebellar form.

The vestibular ataxia exhibits all the peculiarities of this particular form; that is to say, it stands in exact physiologic relationship, demonstrable every moment, to the direction of the nystagmus and the position of the head in regard to the body. If, for example, rotatory nystagmus towards the left side is present, the patient leans to the right on standing upright. If the head is rotated towards the left, he bends forwards; if towards the right, he inclines backwards. Vestibular ataxia is shown most distinctly on testing for Romberg's sign; as a rule, it is accentuated when the eyes are closed, and is almost compensated on standing with the legs widely separated. The same remarks apply to walking as to standing. On walking also the position of the head exerts a definite influence. If, when the head is held exactly straight, the patient inclines towards the right side, on rotation of the head to the left, he staggers forwards."[2]

The temperature is usually not elevated with cerebellar abscess. The temperature before the mastoid operation reached a maximum of 102.6 degrees in the author's case. After the operation it returned to normal and remained there until the cerebellar abscess became manifest. During this stage the temperature ranged from subnormal to a few tenths above 99 degrees. In Neumann's collection, sixty-one had a febrile course, and eighty-five an afebrile one. Nothnagel ("System of Medicine") ascribes the subnormal temperature to a remote effect of the abscess upon the supposed temperature regulating nerve apparatus in the corpora restiformis and other parts of the brain.[5] Leutert (*Arch. für Ohr.,* 47) has traced the fever to a transitory serous meningitis.[6] Hoffman (*Verhandlungen der deutschen otologischen Gesellschaft,* 1906) opposes Leutert's view, and points out that the fever appearing in the course of an uncomplicated cerebellar abscess is invariably dependent upon a concomitant circumscribed purulent meningitis.[7]

The diagnosis, and especially the differential diagnosis, presents greater difficulty, and many times cannot be made before an exploratory operation. This is especially true if a good history is lacking, or if the case has not been under observation for some time. The disturbances of speech seen in association with cerebellar abscess are of a bulbar type, in contradistinction to the sensory or motor aphasia of the tem-

poral lobe abscess. Hemiparesis affects the same side in cerebellar abscess, as a rule, and the opposite side in abscess of the temporal lobe. Ptosis, paralysis of the external rectus, and complete paralysis of the third nerve are often associated with temporal lobe abscess. Paralyses of individual eye muscles and nystagmus with visual pareses occur with cerebellar abscess.

In cerebellar abscess the headache is localized in the occiput or forehead; in temporal lobe abscess, more in the parietal region. Stiffness and sensitiveness to pressure of the neck are very common in cerebellar abscess, but in rare cases occur also with large abscesses of the temporal lobe.

In the author's case the absence of ocular symptoms, with deep, severe, boring, constant pain in the left temporosphenoidal lobe, even with stiffness of the neck, pointed to a temporal lobe abscess.

The prognosis is most favorable when the case is seen early, as very few of the late cases are saved. Körner reports fifty-two per cent of cures from fifty-five operated cases. Koch cured ten out of nineteen by operation, and Okada had sixteen cured cases from twenty-five operated upon. Heinman reports a larger series of cases, giving a total of six hundred and forty-five, only one hundred and ninety-six of which were cerebellar. Of the total number only five hundred and nineteen were operated and one hundred and ninety-three cured. Neumann reports one hundred and ninety-six cases of cerebellar abscess with 25.98 per cent of cures.[3]

Two methods of operating upon a cerebellar abscess present themselves: One a radical mastoid operation, simply extending the operation so as to include the cerebellum, and the other by entering the cerebellum directly through a trephine opening in the skull. The former method is usually preferred, since it enables the operator to remove the primary source of infection, and to follow its path to the cerebellum. It also enables one to evacuate an abscess of the labyrinth when present. The latter method may be chosen for an exploratory operation, especially if undertaken after the completion of the mastoid operation.

Jansen, Koch, Trautmann and Brieger, as well as most modern aural surgeons, operate from the middle ear, while von Bergmann, Chauvel, Macewen, Jourdanet, Schlange, Dean,

Hulke, Barker and Ballance prefer to trephine over the probable site of the abscess.

Joseph C. Beck (*Laryngoscope*, February, 1907, Vol. XVII, No. 2, p. 172) reported a case of cerebellar abscess of otitic origin which remained latent for years, but became manifest soon after a radical mastoid and produced death on the eighth day after the operation. He was unable to find immediately the avenue of infection from the temporal bone to the cerebellum.[8]

Physicians' Building.

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XVI.

SECOND REPORT ON THE THERAPEUTIC VALUE OF RADIUM IN MALIGNANT TUMORS OF THE UPPER AIR TRACT.

By Wolff Freudenthal, M. D.,

New York.

More than a year ago I read a paper before this society on the therapeutic value of radium. Since that time a number of patients suffering from malignant growths have been sent to me from all parts of the country by colleagues in general and special practice. Before enlarging on some of the new features in treatment by radium of these cases, permit me to give you a short review of some of the old cases, those reported in Annals of Otology for March, 1911. What became of these cases?

The first one mentioned, under the heading of malignant tumors, that of F. L. H., a driver, aged 43 (referred by Dr. Harmon Smith), was a patient who was suffering from a columnar cell epithelioma of the antrum and was cured by radium. He was shown to the Section on Laryngology of the New York Academy of Medicine again in October, 1911, without a recurrence, and to-day, i. e., twenty months after the treatment, he is in good condition, feeling perfectly well and healthy.

The same good result can be reported in the next case, that of Mary S. (Dr. S. McCullagh's case), with fibrosarcoma of the superior maxilla. She is a maid in a neighboring physician's house, and when I saw her a few days ago her altered appearance surprised me. The cicatrizations on her face left by the former operations of Dr. McCullagh are barely visible, and she looks in healthy condition.

Case 3, Mr. F. W. H., aged 76, epithelioma of tongue, received little treatment and died soon after (Dr. Wooster's patient).

Case 4, Jacob C., aged 50, epithelioma of tongue and neck (big masses), died a few months after the completion of my last report. Dr. Weinstein, his attending physician, told me the patient never suffered a particle of pain, and died without any suffering.

Case 5, A. J. P., aged 45, of New Britain, Conn. (Dr. Thomas J. Harris' case), lymphosarcoma of nasopharynx, lived six months after my last treatment, and died without pain.

Case 6 was not a malignant tumor—of no interest in present report.

Case 7, reported in full before.

Case 8, S. C., aged 67, carcinoma of larynx, still lives and is very well. Laryngectomy was done by Dr. A. V. Moschcowitz seven years ago.

Case 9, reported completely before.

Case 10, S. S., aged 48, round celled sarcoma of tonsil, is living in perfect health. Was seen last in January, 1912.

It is gratifying to note that three of the previously reported cases are still alive and in apparently good health, not counting the satisfactory case 8, on whom laryngectomy had been done. All three had been treated by various methods, and in all probability would have died very soon if they had not been benefited by the treatment of radium.

I now close the past report, and wish to bring to your attention to-day a new series of cases.

NEW CASES.

Case 11.—Miss Jenny G., age 18, has been sick for the past twelve to fourteen months. She has pain in the left side of the neck and cannot swallow. When she first became affected she went to the Massachusetts General Hospital and was seen by some of the best men there. The diagnosis was so uncertain that some teeth were extracted. Only when the new growth could be felt in the floor of the mouth and externally was the diagnosis of sarcoma determined. She came to New York and was treated by Dr. Coley with his serum, without result, and when she consulted me there were large external masses which were very painful. They were more marked on the left side, and apparently formed one big mass with the one in the pharynx. This mass filled also the entire nasopharynx. She did not return for treatment.

A case that may occur in any clinic was the following:

CASE 12.—Referred by Dr. S. J. Keefe, of Elizabeth, New Jersey. Mrs. L. E. W., age 28, had her adenoids removed in 1905. In February, 1909, Dr. Frederick Connelly, of Port Richmond, S. I., had to repeat the operation, and in December of the same year Dr. Rainer for the third time removed masses that looked like adenoids. In July, 1910, she consulted Dr. Keefe, whose suspicion was aroused. The removal of the adenoids by Dr. Keefe did not cause unusual bleeding, but the microscopic diagnosis of the tissue showed it to be an adenoma. I saw her on October 21, 1912. By this time the left nostril as well as a great portion of the nasopharynx, especially on the left side, had filled up with the new growth. There were, besides, some glandular swellings on the neck. By inserting radium in the left naris for five, ten, thirty, sixty minutes, and finally on November 24th, for three days, we succeeded in getting the nose free. In order to reduce the other masses it was considered best to make an incision from the outsde. That was done in the presence of Drs. Keefe, N. L. Wilson and other colleagues, at the Elizabeth General Hospital, on December 13th, the tube containing radium being buried deeply in the neoplasm and left there for three days. There followed a decided improvement, which unfortunately lasted only a short time. The mass enlarged so rapidly that the presence of pus was apparent. The outer wound having closed, we decided to open it up again and insert radium anew. On January 25, 1912, I visited her again at the Elizabeth General Hospital, and found fluctuation in the tumor in the pharynx. I was convinced that by letting out a mass of pus and inserting radium the patient could be relieved considerably; but she died under anesthesia from heart failure before the operation was started.

Epicrisis.—Although this patient from the beginning did not give a good prognosis, our hopes for prolonging her life were amply justified. Unfortunately, when we started the second operation, the patient was quite emaciated and the pulse rather weak, but with the disappearance of the abscess within the pharyngeal cavity, the possibility of taking food would have increased materially. Afterwards the neoplasm might have been reduced in size by radium, as had been accomplished in this patient's nasal cavity after the initial exposures.

CASE 13.—Trofin W., age 74, a Russian peasant, came to me

complaining of soreness in the throat for the last eight months. He had been treated for tonsillitis. Dysphagia had set in. There was a tumor on the right side of the larynx as big as your fist. The entire larynx was involved and ulcerated. No doubt the extrinsic part of the carcinoma developed first, but the swelling did not annoy him until pain and dyspnea set in. He returned to Russia a few days after this consultation.

It is not surprising if an ignorant peasant is neglectful and indifferent to his condition until it is too late for help; but it is astonishing to find apathy in people of high culture and among colleagues.

For many reasons the following case held my interest for months:

CASE 14.—Doctor . . . . age 70, a well known colleague, whose name is familiar to all of you, had throat trouble for the past two years. He was examined by laryngologists of New York City, but never paid much attention to his physician's instructions. Nor was it possible to make a diagnosis of his case at an early date. And it was only when a swelling, and at the same time an impediment in his speech were noticeable, that the diagnosis of primary epithelioma of the tonsil was made. When I first saw him in conjunction with Dr. H. Arrowsmith, of Brooklyn, and other colleagues, he handed me a typewritten report of his microscopic diagnosis with the words malignant carcinoma underlined. The gentleman who had made the microscopic examination is a colleague whose character and fine tact is just as admirable as his ability, and yet he considered it correct to send such a report directly to the patient. It was harmful.

The right tonsil was involved, the right anterior pillar showing some ulceration. and it seemed that the neoplasm extended up into the nasopharynx. (Examination was exceptionally difficult.) But there was another point of great interest. He could not take any solid food. That was not due to the ulcer, for we could easily overcome these pains by orthoform. The cause lay in his tongue, which he was unable to use for mastication. Undoubtedly there were at that time infiltrations in the tongue, but they could not be felt. (One can readily see how much harder it may be occasionally to palpate an incipient neoplasm when it is located in the tissues below the floor of the mouth.)

We tried conscientiously to relieve our patient, and succeeded in keeping him free from pain by the application of radium and occasionally orthoform, for which he was very grateful. One day when I called on him, when he could no longer speak intelligibly, he wrote: Moriturus te salutat. He was right.

Another case affecting the tongue and its vicinity is

CASE 15.—John E. T., age 59, a plasterer, a patient of Dr. R. Frothingham. He noticed a sore on his tongue two months before, and consulted Dr. T. R. Chambers at the Christ Hospital, Jersey City, who made the diagnosis of epithelioma of the tongue, which was corroborated by the microscopic examination (Dr. George E. McLaughlin of Jersey City). Roentgen rays were applied, but in vain. Patient lost thirty-five pounds in weight and then went to the Vanderbilt Clinic, where he was seen by Drs. Thurber and Frothingham. At the request of these gentlemen, I saw the patient on November 9, 1911. The left half of the tongue was very much involved and ulcerated, causing a great deal of pain in the left ear. Corresponding to it was a big swelling on the outside of the neck that seemed to contain pus. An incision was made, a great deal of pus evacuated and radium inserted. Subjectively the patient felt relief immediately, and was better able to swallow with the help of orthoform applied locally on the ulcer of the tongue. Removal of radium three days later. I did not see this patient again in weeks, and in the meantime the wound had closed. In a very short time there appeared a swelling right under the chin and on the right side of the neck. Undoubtedly these swellings contained pus, and patient could have been benefited by further treatment, but he disappeared.

If a thorough operation with removal of half the tongue and thorough drainage had been permitted and then radium applied this case might have had a fair chance of recovery.

CASE 16.—N. G., a laborer, age 41, complained of headache, obstruction of the nose, epistaxis for the last four weeks, and a feeling of great weakness. He was seen by me first on September 4, 1911, in my clinic. The condition of the right middle turbinal at once aroused my suspicion. It was enlarged, somewhat irregular and of a dark color. A piece had been removed in another clinic, as I learned later, and the diagnosis of sarcoma made. When I removed a portion of that swelling the patient lost a great deal of blood, so that we had to keep him

in the hospital for a few days. The microscopic diagnosis was fibrosarcoma. Two weeks later radium treatment was commenced. On removing the radium an epistaxis again occurred. This happened regularly every time. To avoid this repeated loss of blood I very soon applied radium for twenty-four hours every ten days. This was repeated until finally the mass commenced to shrink visibly. Simultaneously the bleeding grew less every week.

December 30, 1911, we completed the last treatment, radium having been applied up to then for ten full days. Subjectively the patient felt relieved, as he could breathe well through the nose and had no more epistaxis. Objectively the mass had shrunk so much that there was only a small portion left. This the patient objected to having removed for diagnostic purposes. Therefore, it cannot be said positively that this was a malignant growth any longer. This case has remained well to date, i. e., for two months and a half.

CASE 17.—Peter De W., age 76, referred to me by Dr. J. J. Thompson, of Mt. Vernon, New York, on account of adenoma of tonsil and vicinity, seemed to be a good case for radium treatment, but he did not return.

CASE 18.—Mrs. R. M. T., age 80, came from St. Louis to New York by reference of Dr. H. W. Loeb. Her physical condition was quite poor, and her history, as furnished to me by the courtesy of Dr. Loeb, who had her under observation for almost fifteen years, is as follows:

"Mrs. T. had a rodent ulcer of the ala nasi when she first came to me. This was subjected to treatment with X-rays, and although the whole skin around it was more or less affected with deposits, the trouble entirely disappeared. Some little plastic work was necessary. She was under the treatment of an irregular for a short time after that, the result of which was white gangrene, which left a small opening externally through the bridge of the nose. She has had a great deal of trouble with scabbing of the mucous membrane, and the past year has complained of much pain in her nose.

"About four or five weeks ago a very considerable ulceration appeared, which has extended until a large portion of the anterior part of the septum, the floor of the nose and the outer wall of the nose are involved. The septum itself has become perforated."

When this lady came to New York, radium treatment was commenced, according to our usual way, first for fifteen minutes and gradually longer. When we left radium in for twenty-four hours the reaction was severe; edema of the nose and left eye, and terrific headache. After both had subsided we started in again with small doses, i. e., exposure for thirty minutes, increasing it gradually to two hours. But even that could not be tolerated, edema and headache appearing again. In spite of that, the interior of the nose had slowly cleared, with the exception of the ulcer near the ala nasi. At this time, however, it was apparent that the physiologic functions were failing rapidly. Absolute lack of appetite and vomiting followed finally. Nothing would have any effect on the nasal mucosa. A metastatic pneumonia set in and very soon exitus lethalis.

This case, that is narrated here in so few words, gave us an immense amount of trouble and worry. Dr. Loeb from the start made a bad prognosis, but he wanted to give the patient and her solicitous relatives the best chance, for which they were eagerly looking.

Case 19.—Mrs. John W., age 65, of Kingston, Ontario, came to me with Dr. James G. Dwyer of this city. The doctor has known Mrs. W. all his life, and could from personal knowledge confirm the report given by Dr. J. W. Campbell, of Kingston, Ontario. The report reads:

"Family history good on her side. Husband and one son died of phthisis. No history of cancer. Twenty years ago a small nodule developed at or near the inner canthus of left eye, was cauterized and disappeared. Six years ago it returned, attained to size of half a bean. Was again cauterized, but failed to disappear. Had operation for removal performed by specialist, with return almost at once. Now a well developed epitheliomatous condition involving inner canthus, upper and lower lid and side of nose. The Roentgen ray controls but does not cure."

When we examined the patient we thought it best to remove all the diseased tissue first and then apply radium. The fact that the neoplasm had been cauterized, X-rayed, etc., indicated to us the presence of a great deal of connective and fibrous tissue which would not allow the rays of radium to penetrate. Consequently, on November 17, 1911, with the

assistance of Drs. Haskin, Dwyer and my associate, A. Braun, all the diseased tissue was removed and the bones underneath found to be normal. On the following day 70 mgr. of radium of 1,800,000 radioactivity was applied and left there for three days (dressing changed daily). Before the operation the left eye was practically useless, therefore the cornea, which was slightly affected, needed no consideration.

About a week later the radium was applied again and the wound allowed to heal. On December 14th she left for Ontario. A plastic operation was indicated, but that could be done at her home just as well. Up to February 10, 1912, she felt, according to a verbal report from Dr. Dwyer, comfortable and no sign of recurrence visible.*

Very interesting on account of the rarity, were the two following cases:

CASE 20.—B. C., age 39, a Syrian cook from Los Angeles. He came here on account of severe and persistent headaches during the past eight months. A sarcoma of the left sphenoid sinus was found, the only case of that kind I have ever seen. I saw him but once, as I left for my vacation the following day.

CASE 21.—Rev. J. B. M., of South Carolina, age 73 a personal friend of Dr. Harmon Smith's, was referred by the latter with the diagnosis of epithelioma of the middle ear. Facial paralysis of the same side (right) was present. The patient gave the following history: Had trouble in his right ear in 1897, but felt relieved after taking a tonic prescribed for him. Four years and a half ago the ear closed up and he could not hear anything. On several occasions granulations (?) were removed and radium applied, but never longer than about an hour. The paralysis of the facial nerve set in September 21, 1911, and he came to me on November 4, 1911. The diagnosis of epithelioma of middle ear was beyond a doubt. At once the question arose, shall the mastoid be opened and then radium applied, or the latter be inserted through the external canal without any operation? Taking into consideration the age of the patient and the risk of such an operation, Dr. Smith and the writer agreed that it was to the best interest of the patient not to operate. Radium of

*July 10, 1912, according to a letter received, patient was still in good condition, eight months after treatment.

1,000,000 radioactivity was applied for three days and the dressing changed daily on account of the purulent discharge from the middle ear. That was repeated for a day once more and patient left November 27th for his home. Returned January 24, 1912, and had radium inserted for one day. The question of opening the mastoid arose again, but was rejected. Subjectively he feels better and believes that he will be cured. Inserted radium for three days, i. e., from January 31st to February 3rd, and this time the strongest radium we have, viz., 70 mgr. of 1,800,000 radioactivity. Case is still under treatment.

CASE 22.—C. F., aged 65, milkman, referred by Dr. L. M. Hurd, of this city. In the ANNALS OF OTOLOGY for June, 1907, Dr. Hurd reported this case of adenocarcinoma of the right maxillary antrum in full, eighteen months after operation. The salient points may be repeated here.

Patient complained of nasal obstruction, had small swelling on alveolar process for the past ten years, for fourteen months swelling of the face and hard palate. Radical operation on December 9, 1905, with ligation of the carotid. As the examination of the growth gave evidence of its malignancy, Dr. Hurd immediately after the operation had the wound X-rayed, with the result that at the end of eighteen months there was no sign of a recurrence. Very soon, however, one set in. According to a personal report Dr. Hurd had to remove in June, 1907, the anterior half of opposite maxilla.

"About one year later, a small nodule was removed from nasal septum posteriorly.

"January, 1910, removed malar bone, and in March, 1910, had to remove eye and clean out orbit.

"May, 1910, admitted to the hospital on account of rapid extension in soft palate. He improved and went back to work in two weeks.

"Now has been X-rayed for a number of months, and on December 12th a specimen removed which shows no change in character of structure from the X-ray.

"At present the velum is infiltrated and there are nodules about the orbit."

In addition to that there was a hard mass in the cavity of the antrum when patient called on me. Radium was applied several times for from two to three hours at a time, with the result that mass began to ulcerate soon.

This case is only in the beginning of the treatment, but is mentioned here on account of its great interest and the perseverance with which the patient had been treated by Dr. Hurd. A further report will follow later.

In reviewing these twenty-two cases treated with radium we notice that three of the cases reported last year are still without recurrence and in good health, while of the new cases two are so much improved that they might be pronounced cured. Too short a time has elapsed to give any definite opinion. The writer would not like to produce the impression that he was able to cure five cases out of twenty-two, or about 19 per cent. This is not in accordance with statistics. The fact is that I have seen quite a number of malignant tumors which are not mentioned here at all. For example, one patient consulted me on account of carcinoma of the larynx, and on examination metastases were found in the lungs and in the whole abdomen. No radium could be applied here. In such a case only a chemical product like salvarsan or perhaps selenium could possibly be effective. But the effectiveness of radium, when all other drugs were powerless, is exemplified by case 19, Mrs. J. W., and case 21, Rev. ——. The latter shows great improvement and did not have a particle of pain for several months, while Mrs. J. W. shows no recurrence, thus far, of the neoplasm. At any rate, in both of these patients, radium has done a wonderful amount of good. Even if cure is not positive and permanent in such cases, the palliative effect is excellent, and that is the essential in the treatment of many such cases.

That radium destroys malignant tissue to a great extent has been shown in the cases reported above and has been proven by others, especially M. Einhorn, of New York. In stricture of the esophagus, caused by malignant tumors, in which a fistula of the stomach was indicated, Dr. Einhorn succeeded in shrinking the neoplasm by radium to such a degree that, sometimes after one week's treatment, considerable nourishment could be taken per os. A similar process set in in many of our cases, and that often gave great relief, if only temporarily.

So far it has not been possible to decide what the true nature of radium is, in other words, what physiologic effect the rays of radium produce. Accordingly, the actual therapeutic

mechanism of radium is as yet entirely unknown. Many theories based occasionally on elaborate experiments, have been promulgated. Some believe that by the rays of radium a trophic disturbance of the cells is created which finally leads to a dystrophy of these cells. (Similar explanations are given by some men in Paris, who use fulguration for the destruction of malignant growths.) The bactericidal effect of the radium rays has been proven by several observers.

Darier was the first to demonstrate the analgesic properties of radium in different affections. Almost invariably I could see that beneficial action followed the application of the radium rays, and could cite many cases in corroboration of this fact. There was but one exception, the lady of 80 years—Dr. Loeb's patient—she could finally stand no medication, whether it was a weak dose of codein or morphin or any other drug.

The influence of radium on living tissue, I must say, is so active that no organ of the body is indifferent to it. Some patients show a quick reaction on comparatively small doses, while others can stand much stronger ones, just as in all other medicaments.

In applying radium we naturally observe different states. The first is a hyperemia, with or without edema of the mucosa, and an increased growth. Following this the tissues break down, we have ulceration, necrosis, and finally formation of new connective tissue. The latter grows so massively, as I have observed, in large tumors, that it occasionally forms a firm wall which does not let the radium rays penetrate into the neighboring parts. That was most evident in case 4, where the patient wore a radium tube for ten days continually, with no effect.

In order to get any therapeutic result with radium or any other drug, the necessity of an early diagnosis is of first importance, but herein lies the great difficulty. For example, in the larynx. Each of us knows the difficulties in reaching a correct diagnosis when the larynx is involved. We are no further advanced to-day than we were a quarter of a century ago, when the celebrated case of the German Crown Prince filled the columns of all the newspapers. But you would think the diagnosis much easier when the pharynx or nose or the neck is involved. In the nose the growths in the beginning

look like benign tumors, and it takes an experienced eye to discover a suspicious aspect. Dr. Harmon Smith made a very early diagnosis in the case of Mr. F. L. H., case 1, and the patient was cured. In private practice, but especially in dispensaries, many such cases are overlooked. Patients come for treatment after glandular involvement has set in.

The same holds good for the retropharynx. Such a case is that of our colleague (case 14), which was not correctly diagnosed because he refused any further consultations until it was too late.

In contrast is Dr. Keefe's case, where he operated for simple adenoids, but the rapid recurrence made him suspicious of the nature of the disease, and microscopic examination confirmed these suspicions of malignant growth.

The neck is another field of difficulty for early diagnosis, since one can often neither see nor feel any new growth.

In the treatment of malignant growths we do not rely nowadays solely on the knife, as we have other resources to prevent recurrences. Thus the electric arc light is applied in the form of the so-called Forest's cold cautery and the high frequency Hertzian waves. This fulguration method, that is being used prevalently in Paris, tends, as the authors believe, to devitalize the cancer cells, thus destroying the growth. Furthermore, Roentgen rays have been used, and last of all the emanations of radium. It is a known fact that by this last metal, tumors at first inoperable have been rendered operable, "and the influence of the rays is in all respects palliative." If we add to this the actual cures that we have been fortunate enough to achieve, we have all reason to continue our experiments with radium and to express the hope that some day considerable and lasting good will come from it.

XVII.

MYALGIA WITH OR WITHOUT OTITIS.*

By Francis W. White, M. D.,

New York.

No doubt many of you have been impressed by the number of patients, either at your offices or at the clinics, suffering from pain in certain more or less restricted areas of the head. At the time neither the subjective symptoms nor the otoscopic findings give much aid in diagnosis. It seems strange, however, that some of these cases with no aural conditions come to an otologist for treatment. Many have but slight ear conditions, while others have a tubotympanic catarrh or a suppurative middle ear, either acute or chronic. If we go into the history carefully, we may find that the pain or headache, as they sometimes describe it, is localized in the region of the mastoid process at or about the point of insertion of the sternocleidomastoid muscle, or possibly just back of the ear, the posterior portion of concha, or within the external auditory canal. The temporal or frontal regons are also frequent sites of pain, either singly or in combination, or all of the above areas are the seat of somewhat diffuse pain.

Naturally if we palpate it will be within the area involved as stated by the patient, when such is possible. If this is done, some surprise may attend our action when it is discovered that marked tenderness is present, especially as we pass from the frontal region to the mastoid process or body of the sternomastoid muscle, about its center and distal end.

It may not be amiss to direct your attention to a somewhat superficial examination of the side of the head and neck. We note the very intimate relations between the trapezius and the sternocleidomastoid muscles, two important muscles in the control of the constantly moving structure, the head; also the

*Read before the New York Academy of Medicine, Section on Otology, December 8, 1911.

close connection between the latter muscle and the temporal and nearly inseparable small external ear muscles; further, the temporal and frontal, and frontal orbicularis connections. Within, in the boundaries of these muscles, are the exits and courses of important nerves and blood vessels. Any one of these large muscles, by reason of the inelastic fascia covering it, can by contraction draw to some extent upon the fascia of its neighbor, which blends with its own.

Of especial interest to the ear surgeon are the sternomastoid and trapezius muscles, on account of the frequent occurrence of myalgia in them and the proximity of their attachments to the structure of the external ear and the almost direct connection with the temporal and frontal muscles.

The nerves playing important rôles are the branches of the trifacial, the supraorbital and the auriculotemporal, the latter sending a branch or two to the external auditory canal and one to the ear drum. The branches of the vagus, the spinal accessory, and the sympathetic must be included.

The causes of a myalgia no doubt are many—faulty metabolism, rheumatic tendency, or faulty innervation. Blood conditions, such as anemia or chlorosis, may be causative or accompanying conditions. The ever handy neurasthenic state may also be added to the list. Cold, beyond doubt, is a very important factor and one of the most common causes.

A patient suffering from myalgia of one or more of the previously mentioned muscles may present himself with a multitude of symptoms which apparently are without interpretation, such as the pain in the mastoid region which is markedly increased by pressure, although there is no ear condition to explain such a result. This, then, is an exceedingly important point for differential diagnosis when the patient is suffering from an inflammatory middle ear condition.

Halle[1] reports cases of suppurative middle ear in which on account of the severe pain in the mastoid region, he opened the mastoid process and did radical operations, although he found the mastoids intact during the operation. The results were very gratifying, both from the standpoint of the suppurative middle ear conditions and from the disappearance of pain and other symptoms complained of by the patient. He was chagrined, however, after the lapse of a few weeks to find that the former symptoms gradually returned and then

rather quickly attained their former severity. He then referred some of the cases to Peritz,[2] whose contributions upon the subject of myalgia are intensely interesting. He made diagnoses and instituted treatment for such conditions with excellent and permanent results.

The explanation given for the return of the symptoms is that the fibers of the sternomastoid, being severed from their point of attachment, held in abeyance the tugging of the affected muscle, which, after healing and uniting, regained its former tonicity.

In cases of myalgia, not only is pain a prominent symptom, but also the patient may complain of a sense of weight upon the head, a tired feeling, nausea, vomiting and dizziness, the latter especially if the head is bent forward or to one side. There is an inability to think, irregular heart action, earache, noises in the ear and hyperacusticus. Of course, some of these symptoms do not occur only in a myalgia, but the symptom complex should at least keep us on our guard to examine such cases carefully, even in the absence of direct ear signs and symptoms and prevent us from too hastily diagnosing hysteria or neurasthenia. There are few surgeons, indeed, who have not had experience with the too tightly applied first few turns of a head bandage and the symptoms induced thereby. It does not, therefore, require a great stretch of imagination to appreciate the fact that a myalgia, as previously described, especially the bilateral form, can by its constant dragging give rise to very annoying symptoms, particularly in a person with an easily affected nervous system.

The muscles involved have areas of tenderness easily elicited by palpation. One muscle may have but one point or may have several. These same areas are more sensitive to the faradic current than normal areas and there is hyperesthesia of the skin, as determined by the use of a needle. The sternomastoid shows three areas of election, namely, at its insertion, and its origin, but most frequently about the center or junction of its two heads of origin. The trapezius is affected either about the acromion process, along its anterior border which runs parallel to the sternomastoid, or at its partial point of origin from the superior curved line of the occipital bone.

It is not within the scope of this paper to go into a detailed account of the physiology of the numerous nerves affected by

the condition under discussion, but there are symptoms that may be explained by considering some of them. Therefore, I will be brief. It is possible that if the auriculotemporal is involved, pain can be experienced within the external auditory canal; also, by reason of the branch to the ear drum, both noises in the ear and hyperacusticus may occur.

Naturally, if the supraorbital is involved, pain in the frontal region will arise. A vagus irritation could give rise to gastric and cardiac symptoms. An involvement of all at the same time, therefore, may give rise to a very complex symptom group which, it must be borne in mind, is not pathognomonic of myalgia in the aforesaid regions. The cause may be some other condition, but if we can relieve only a small number of patients by means of a diagnosis of myalgia of one or all the symptoms we have done much in the art of healing.

I have so far had a series of twelve cases in which a positive diagnosis of myaligia could be made. They showed the following points of interest:

Ten cases were females, two were males. Age range was between twenty-five and fifty-two. The right side was involved five times, the left five times, and both sides twice. The sternomastoid was involved alone eight times, the trapezius alone, once. The sternomastoid and trapezius together, once. Both sternomastoids, twice. Greatest length of duration before treatment was instituted, five months. In one case during wet weather the symptoms became aggravated. Two cases slept with affected sides toward open windows. One had an associated intercostal neuralgia. One case developed the myalgia synchronously with an acute exacerbation of a chronic suppurative middle ear disease. Only two cases received inflations of the middle ear on account of an associated tubotympanic catarrh. Few cases have appeared since the disappearance of hot weather.

In some the cause has been somewhat obscure, yet the result of treatment has been gratifying regarding relief and cure. The earlier cases to date have not had any recurrence, even after weeks of freedom from all symptoms for which they sought relief, while others still under observation are either free or progressing favorably. The greater number have been treated as rheumatic cases, others have been treated in a similar manner plus a sedative treatment, and all have received

treatment directed to proper elimination by means of the gastrointestinal tract—this I think is very important. My success with Peritz's method has been practically nil, as patients complain bitterly about the introduction of the needle into the affected area, and so far have not returned for a second treatment. The method is to introduce about a half cubic millimeter of sterile normal salt solution into the tender area or areas found in the muscle or muscles, to be repeated within three or four days, if necessary, although the condition may clear up within this time. There is severe pain at the time of the injection, lasting for a few minutes. Within four or five hours pain reappears and lasts possibly six or eight hours.

Myalgia is a frequent condition, and its consideration and, especially, its treatment are worthy of your attention.

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XVIII.

ACUTE MASTOIDITIS, SINUS THROMBOSIS, SUPERFICIAL BRAIN ABSCESS; RECOVERY.*

By Frank Tucker Hopkins, M. D.,

New York.

In July, 1911, I was asked by Dr. Walton Martin to see a case of mastoiditis which had that day been admitted to St. Luke's Hospital.

The patient was a boy of fifteen years, well developed and vigorous in appearance. He had had a discharging ear for two weeks and mastoid pain for four days. Myringotomy had been done twice, the last time four days before I saw him. I found an abundant discharge in the right ear, the canal somewhat narrowed, the membrane bulging in its posterior and upper portions. The mastoid was very tender over the antrum and over the tip. The patient's temperature was 104.8° rectal, the pulse 104, respirations 26; his mental condition was dull, and he looked decidedly ill. A smear from the aural discharge showed a streptococcus infection. The heart, lungs and kidneys were apparently normal, and there were no cerebral symptoms; but the very high temperature showed serious complications. An immediate mastoid operation was, of course, indicated, and at Dr. Martin's request I operated.

The mastoid was found to be very extensively involved; there was general necrosis with a good deal of free pus. The dura was exposed and appeared healthy. The sinus was also exposed. While it showed a lack of lustre there was no apparent clot, for a small puncture caused free bleeding from below and from above. At the completion of the operation the usual dressing was applied, the sinus being carefully protected with a separate layer of iodoform gauze. I had hoped to extend my operation to include the jugular, but at this point

*Read before the Otological Section of the New York Academy of Medicine, January 12, 1912.

the patient's pulse was so rapid and weak that I did not feel warranted in doing more at that time, and so postponed further operation until the next day. The family, however, were reluctant to have a second operation, and it was not until the fifth day, four days after the first operation, that they would consent to the removal of the jugular. In the meantime, as may be seen by the chart, the temperature had become typically that of a sinus thrombosis, and the boy had had two chills, one of which was severe. The blood count, made the day after the operation, showed a leucocyte count of 17,000 white with 83 per cent polynuclear. The blood culture, negative for the first twenty-four hours, at the end of the second day showed streptococci in two flasks. Examination of the fundus of the eye was negative, and there were no cerebral symptoms except that of lethargy, which was easily accounted for by the fever.

The chills, the sudden extremes of temperature and the prostration at last served to convince the family of the necessity of another operation, and on the fifth day I removed the jugular. The vein was found to be absolutely empty, making the operation difficult and prolonged, so that when it was completed the patient's condition did not permit an exploration of the sinus. I therefore deferred this operation for a day, but again the family's objections compelled a further postponement. The temperature on the day after the jugular was removed fell to 101.5°, but rose again to 104.6°, and for three days varied from 105.2° to 98.2°. The patient was dull, much duller than before, and inclined to sleep a good deal. He was also slightly delirious at times; but except that the pulse was not very rapid—not as rapid as the temperature would seem to demand—being rarely above a hundred, and sometimes as slow as eighty-five—except for this, there was no indication of cerebral involvement. There was no stiffness of the neck, no exaggerated reflexes. The Babinsky reflex was absent, and other reflexes were dull. After five days of anxious waiting the family consented to an operation for the removal of the sinus clot. Just before the time arranged for the operation the patient had a hard and protracted chill, and the temperature dropped to 95.8°.

At this operation the sinus was found discolored, somewhat gray and necrotic in appearance, and slightly flattened rather

than full. Palpation showed nothing. I made an incision of an inch in length towards the bulb, and at once a foul-smelling, somewhat purulent and bloody fluid came away, while further exploration brought out small masses of disorganized brain tissue. I had evidently opened into a brain abscess. The cavity was not apparently deep or extensive, but I made no very exact exploration of it, not wishing to disturb the brain tissue more than necessary.

It is evident that we had here a broken-down thrombus forming an abscess on the brain surface, that the pus had invaded the brain substance, forming an abscess in the brain close to the surface, and that the abscess so formed had distended the brain surface, pressing it into the overlying sinus cavity, so that when I opened the sinus I cut directly into the brain.

As there was no bleeding, either from above or below, I drained the abscess by the insertion of indoform gauze in the opening which I had made, and dressed the rest of the mastoid wound in the usual way. I did not attempt to explore the sinus further. The patient's condition was very serious when the operation was completed, and it was two hours before he rallied well.

During the four days following this operation the temperature remained low, generally between 99° and 101°, and the dullness and apathy of the patient passed off. Then there began again to be fluctuations of temperature—a rise to 102°, a fall to 98° and again to 97.2°—but until the fourth day these variations of temperature were not rapid or sudden, and there was no chill. On the fourth day, at the bed-side dressing, I found that the upper portion of the exposed sinus—that extending towards the torcular—was soft to the touch. So with an exploring needle I drew off a little blood stained serum, and followed this exploration by opening the sinus freely for about an inch towards the torcular, removing thereby an additional quantity of fluid, and then packing the cavity with iodoform gauze. The cavity of the sinus here stood open and was clearly discernible, with the solid clot showing farther up. The fluid removed by the exploring needle showed the presence of streptococci.

After this, as the chart shows, there were no further disturbances of temperature and no other complications. The

patient made steady improvement to a good recovery. The neck wound healed rapidly and satisfactorily, and the mastoid wound was absolutely healed in seven and a half weeks from the day of the first operation. The hearing was perfectly good.

The interest of this case lies largely in the unusual character of the brain abscess. This abscess might be termed a subdural abscess, but as the pus had invaded the brain tissue, it was, pathologically, more than subdural. Nor could it properly be called, in the ordinary acceptation of the term, a brain abscess, as that implies an infection through intermediary channels, while this was clearly due to infection by contiguity. I have used, therefore, the term superficial brain abscess as being most satisfactory for its description.

Owing to the confusion of terms, references to this form of abscess are very hard to find. There are, I believe, two such cases in the list of brain abscesses published by Dr. Dench in 1907 in a monograph entitled "Otitic Brain Abscess"*; but in the literature published since then I have been able to discover none.

182 West 58th St.

*Dench. Transactions American Otological Society, 1907, X, p. 486.

XIX.

REPORT OF A CASE OF ASPIRATION OF SILVER TRACHEOTOMY CANULA AND REMOVAL BY LOWER BRONCHOSCOPY.*

By John G. Hunt, M. D.,

Fort William, Canada.

Patient, Mrs. F. H., age 36, Finn, six years previously had had a tracheotomy performed in Finland, for laryngeal diphtheria, since when she had always worn a tracheal tube, and incidentally had become quite expert in its removal and cleansing.

On the afternoon of February 5th, however, upon attempting to withdraw the canula, the collar became detached, allowing it to recede into the trachea. This was followed by a momentary spasm, during which the patient quickly introduced a second tube, of which she had an assortment, and after a brief spell of coughing, accompanied by deep inspiratory movements, the patient suffered no further inconvenience.

Two hours later, when I saw the woman in consultation with Dr. Williamson of Port Arthur, we found the patient apparently no worse for her experience, and indeed, had it not been for the mute evidence of the broken canula collar we might have been tempted to doubt her veracity. Physical examination of the chest was negative.

In virtue of the prime importance of early treatment in such cases, however, I had the patient removed to the R. M. G. Hospital for X-ray examination, which was most successfully done by Dr. Williamson, the missing canula being located in the left lower quadrant of the heart shadow, as shown in the accompanying skiagraph.

Under infiltration anesthesia the tracheal wound was enlarged and the trachea cocainized with 20 per cent cocain.

*Read before the Thunder Bay Medical Association, March 4, 1912.

The 7 mm. Jackson bronchoscope was then introduced without difficulty and passed down into the left bronchus.

At about 6 cm. beyond the bifurcation, the round, ragged, upper edge of the tube was discovered firmly wedged in one of the posterior branch bronchi. About one-third of the edge of the tube was already overlapped by edematous mucosa, so that had there been much delay it is certain great difficulty

Rough sketch of metal tracheotomy canula, showing ragged upper end aspirated into left bronchus.

would have been experienced in seizing and removing the tube. As it was, however, this was quite readily done, although on account of its size and shape it was necessary to remove the canula, forceps, and bronchoscope with one motion.

A fresh tracheal tube was then inserted. The patient left the hospital the following morning no worse for her unique experience.

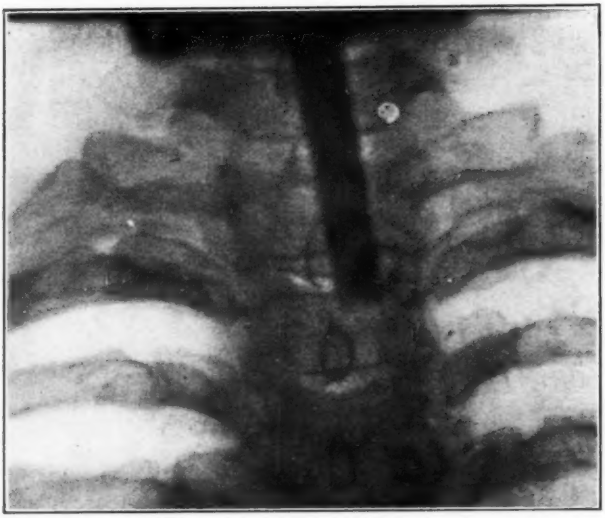

FIGURE I.

Radiograph of thorax, looking from behind, showing broken tracheotomy tube in left lower quadrant, and second tube in proper position in trachea.

XX.

CASE OF GUNSHOT WOUND OF THE EAR.*

By John B. Rae, M. B., C. M.,

New York.

L. S., an Italian, 31 years of age, presented himself at the ear clinic of the Postgraduate Hospital on Saturday, December 23d, giving a history of which the following are the essential details: Six weeks before, while "fooling with a 22 caliber gun," as he expressed it, the weapon was accidentally discharged while in close contact with the ear. Within half an hour afterwards he was unconscious and was removed to a general hospital, in the surgical ward of which the bullet was removed. Two weeks later he was able to go home, and in the interval between leaving the hospital and presenting himself at the clinic, he had been under the care of a private physician.

On examination the patient looked sick. Temperature was 100°, respiration 20, and pulse 76. There was a marked facial paralysis on the right side. On removing a narrow strip of gauze with which the right external meatus was packed, there followed a copious discharge of thick creamy pus. The canal was completely occluded by granulation, preventing any view of the fundus. Further examination revealed an acute, urgently operative mastoiditis.

Rigid inquiry failed to disclose that the patient had at any time presented symptoms referable to the vestibular apparatus. The good ear being excluded, he was readily able to hear the loud spoken voice. Absolute bone conduction was increased and the Weber was referred to the bad ear. No attempt was made to obtain a caloric reaction, and this for two reasons: First, because of the absence of symptoms referable to the vestibular apparatus, and, secondly, because if the test had

*Read before the New York Academy of Medicine, Section on Otology, February 9, 1912.

proved negative no deduction of any value could have been drawn on account of the granulation with which the canal was blocked.

A radical operation was advised because of the very probable destruction of the middle ear structures, because of the facial paralysis, and because of the copious discharge and presence of granulation.

The patient was admitted and the radical operation undertaken. The mastoid proved to be quite cellular and involved from end to end. On breaking down the posterior wall something unusual was discovered in the middle ear. This proved later to be a considerable portion of the bullet. It was firmly jammed in the middle ear under the overhang of the posterior wall extending from the neighborhood of the oval window to the floor. Only on removing the overhang to the limit was it possible to remove the fragment. The promontory was intact. No trace of ossicles could be discovered, although carefully watched for in the course of the operation. The posterior wound was partially closed by suture and packed, but no flap was cut.

The immediately subsequent course of the case was not very satisfactory. The day following operation the temperature rose to 104° with the appearance of a pronounced cellulitis almost erysipelatous in character. Thirty-six hours later the temperature had dropped to normal, but the wound was dirty and there was considerable sloughing, both within the wound and around the margins of the incision. The neck became infiltrated and a counter opening had to be made.

On January 11th, matters having improved, the wound was reopened, cleaned out, a flap cut and the posterior incision closed. The tissue was unsatisfactory to work upon and several sutures had later to be removed. However, the general progress has been very good, and today the posterior wound is almost completely closed and the middle ear promises to be dermatized and dry very shortly.

Functional examination two days ago showed marked improvement in the hearing for the voice, increased bone conduction and lateralization of the Weber to the bad side. The caloric test gives a positive reaction. So far, the facial paralysis has not improved.

For comparison a whole 22 caliber bullet is handed around

with the fragment removed. The bullet weighs 34 grains and the fragment 15 grains. It would be interesting to know, unless the bullet became fragmented on being fired, just how the general surgeon managed to effect a separation.

It is also interesting to note that the discovery of nearly half the bullet may be described as almost accidental, as there seemed to be no reason to doubt the story that it had already been removed, and that this discovery may be directly attributed rather to the involvement of the mastoid than to the condition of the middle ear, at least as far as the patient and his family physician were concerned.

From the otologic standpoint the matter of most interest must be that the discharge of even a 22 caliber bullet directly into the ear may completely destroy the structures of the middle ear, give rise to a facial paralysis and yet fail to destroy the labyrinth.

247 West Seventieth Street.

XXI.

OPERATIVE TREATMENT OF SINUS THROMBOSIS.*

By George L. Tobey, Jr., M. D.,

Boston.

The early diagnosis of sinus thrombosis during the course of aural disease is of great importance. This complication occurs more frequently during the course of acute suppurative otitis media, and more often on the right side; this latter may be due to the fact that the sinus is larger on the right and further forward.

The cause of the thrombosis may be simply pressure from a perisinus abscess, by direct infection through the sinus wall from a perisinus abscess, or to extension of the thrombosis and infection of the small veins from the middle ear and mastoid, which have become thrombosed through the ostitis accompanying the acute infection. The last mode of infection is the more common, and is demonstrated in the cases where a thrombosis of the jugular bulb is found in acute suppurative otitis media and acute mastoiditis without free pus in the region of the sinus.

The first symptoms noticed are an uncomfortable sensation throughout the head, which may or may not be described as headache, and increasing general malaise, followed, as a rule, by a rapid rise of temperature with typical septic remissions, and often accompanied by chills and chilly sensations; although we have all seen cases without this type of temperature. As the venous stasis increases, owing to the narrowing lumen of the sinus or jugular bulb, or owing to sepsis, nausea and vomiting may be present. The venous stasis increasing, there may be an engorgement of the retinal vessels, leading on to optic neuritis. I have not found this to be pres-

*Read by invitation before the Section of Otology, New York Academy of Medicine, December 8th, 1911.

ent as often as one is led to expect by the literature. Edema over the posterior portion of the mastoid and extending toward the occiput is found in the cases in which the mastoidal emissary is primarily thrombosed from the ostitis, or is blocked off by the extension of the thrombus in the sigmoid sinus. When present it is of value as a diagnostic point, but its absence does not imply that a thrombus may not be present in the sinus, either above or below the point of entrance of this vein. I have never seen tenderness over the mastoid, nor in the soft tissues immediately below, which could not be accounted for by the periostitis and general infection accompanying mastoiditis, and this symptom has, to my mind, no value as a diagnostic point in the question of thrombosis. In a series of over one hundred cases I have never observed a case in which the thrombosed jugular vein could be palpated.

The blood in the early stages of thrombosis shows, as a rule, an increasing number of white cells, with a larger per cent of the polymorphonuclear cells; this increase is rarely over 20,000, and many cases show no increase whatsoever. When the thrombus is infected or broken down, a bacteremia may be demonstrated by blood culture. I do think that in many cases a diagnosis may be made before a positive culture can be obtained.

Since a thrombus extends against as well as with the blood current, it must follow that in a thrombosis of the sigmoid sinus and jugular bulb the same condition may be found in the petrosal sinuses. This may account for the venous engorgement of the optic disc leading in some cases to an optic neuritis, due to the venous stasis in the cavernous sinus and ophthalmic veins. I do not wish to be too dogmatic in this statement, since I know that the subject of choked disc is a mooted one among the ophthalmologists. I have one case, however, bearing out this theory. A boy having had an acute mastoid, ran an indefinite temperature, with typical septic remissions, beginning several days after operation and unaccompanied by chills, although he complained of chilly sensations with indefinite headache. The fundi were examined by Dr. Standish, who reported a beginning venous stasis. The sinus was exposed and showed nothing externally. On making an incision through the sinus wall a mural thrombus nearly occluding the lumen was found extending from just below

the knee to and including the jugular bulb. The internal jugular vein was immediately ligated and the thrombus cleared from the sinus. Following the ligation there was an increase of venous stasis in the eye, which gradually subsided as collateral circulation became established.

A thrombus in the sigmoid portion will not, as a rule, give rise to an optic neuritis, as the superior petrosal sinus is relatively small, and the increased venous pressure in the cavernous sinus is readily compensated by the larger inferior petrosal which empties into the jugular bulb. In thrombosis involving the bulb, on the other hand, there will be a marked venous stasis through the cavernous sinus and ophthalmic vein; this stasis is relieved by means of the transverse sinuses to the opposite internal jugular vein, and through the superficial circulation by means of the superior ophthalmic vein to the facial vein. Many of the cases which we see have a clear cut line of symptoms, and the course of the disease may be followed with great accuracy.

These cases should not be taken as typical of all cases of sinus thrombosis, as we are frequently called upon to make a diagnosis where many of these cardinal symptoms are absent, or where no definite history of the case is obtainable.

There is the type of case, following an acute suppurative otitis media, in which the ear condition is at first overlooked by the general medical man, and a diagnosis of typhoid is made. These cases run a typical typhoid temperature with general malaise and prostration. A case of this nature has but recently been called to my attention. A woman having an acute suppurative otitis media of one week's duration, with tenderness over the mastoid, slight headache and a temperature of 100°, was advised to enter the hospital for observation and operation. Treatment refused. Five days later I was called up by a physician and found that she had been admitted to a general hospital with the diagnosis of typhoid fever, she having made no mention of her aural condition. During the routine examination it was found that the Widal reaction was negative and that there was a marked streptococcus bacteremia, further questioning bringing out the aural history.

This is the type of case which is not infrequently met with in consultation, when the disease has reached a much more advanced stage and the patient is in extremis. In all probability all of you are able to recall similar cases.

The differential diagnosis is often difficult; one of the most difficult being erysipelas coming on a few days after an acute mastoid operation, the chills and temperature appearing two or three days before the typical eruption. I have seen one case in which the jugular was tied and free hemorrhage obtained from the sinus, erysipelas becoming evident forty-eight hours later.

Malaria with its temperature and chills occurring during the course of an acute or chronic mastoiditis, before or after operation, is apt to cause considerable anxiety.

Acute tonsillitis should always be ruled out, as it readily may be by examination of the throat; yet many of us can recall cases in which this cause for the temperature, etc., has been overlooked.

The early stages of pneumonia before local signs can be found may present the same subjective symptoms that are found in a beginning sinus thrombosis. Pneumonia, typhoid and all possible septic foci throughout the whole system must be considered and excluded. I wish to report one rare complication which I have encountered but once and which nearly caused me to overlook a septic thrombosis of the sinus, namely, mastitis following pregnancy.

CASE OF EXTRADURAL ABSCESS, SEPTIC THROMBOSIS OF THE LATERAL SINUS, COMPLICATED BY PREGNANCY. OPERATION, WITH RECOVERY.

On August 10th, I was called by Dr. J. Goodwin of Clinton to see the following case: An Italian woman, twenty-three years old, married, and seven months pregnant.

May 6th, three months previous, she had been admitted to the Clinton Hospital with a profuse suppuration of the right middle ear and marked tenderness, with edema over the mastoid. Slight jaundice. Temperature 100°. There was no blood count. The patient refused to submit to mastoid operation and was discharged—"Unimproved—against advice"—on May 7th.

August 9th she was readmitted with the following history: After leaving hospital, the discharge from the ear, varying in consistency and amount, continued till three weeks ago, since which time the ear has been dry. The tenderness over the mastoid has persisted to date, but pain has not incapacitated patient for work, that of keeping house. Ten days ago the edema over mastoid began to rapidly increase and the tender-

ness became more marked. There has been no vomiting nor chills. Slight dizziness for two days. Severe occipital headache two or three days.

Physical examination showed a well-developed woman, fairly nourished. Heart and lungs normal. Eight months pregnant. Urine negative. On the right side of the head there was a prominent swelling extending from a point 1½-2 cm. posterior to auricle to the occipital protuberance, and from a point 1 cm. from the median line to a level corresponding to the tip of the mastoid process. This swelling was firm and no signs of pain were elicited on pressure.

Over the mastoid bone itself there was very slight edema, and tenderness was elicited on deep pressure only. There was marked sagging of the posterior and superior canal walls. The membrana tympani, pale pink in color, was slightly edematous, although the landmarks were readily made out. There was no perforation. Spoken voice heard at four feet. Blood count showed 14,300 leucocytes. Temperature 99.8°. Pulse 120. Respiration 20.

Operation.—Ether. An incision started just above auricle and ½ cm. posterior thereto was carried downward and backward to the tip of the mastoid process. The periosteum when elevated showed the cortex white and firm. The sclerosed cortex was removed with chisel and mallet. The cells were found to be diploetic in character and filled with foul creamy pus. The antrum was opened with gouge and curette. The diploetic cells, all of which contained pus and granulations, were found to extend for 2 cm. above the temporal ridge in the squama and for 1½ cm. forward in the zygomatic process.

It was found necessary to enlarge the wound, and a posterior incision was made at right angles to the original, on a plane passing through the middle of the external auditory canal. This incision was made through the swollen area, in which was apparently a very marked venous stasis, as the tissues were engorged with dark venous blood. The periosteum when elevated showed no apparent superficial osteomyelitis.

The bone cavity was enlarged. Broken-down diploetic cells extended for 1 cm. posterior to sinus; beyond this point the bone was apparently healthy.

When the lateral sinus was exposed, its walls were apparently normal except over a small area high up, which was dark and granular. The tegmen antri et mastoidei were found to

be soft and necrotic, and their removal evacuated about one dram of foul greenish pus from the middle fossa. The dura was dark, soft and granular at this point, but no perforation of the dura was found.

The tip of the mastoid was not removed. The horizontal incision was partially closed with silkworm sutures and the wound packed with iodoform gauze. The membrana tympani was incised and a small wick placed in the external auditory canal.

Good recovery from ether.

August 11—Patient comfortable. No pain. Temperature 97.7°. Pulse 103.

August 12—Temperature 98.4°. Pulse 89. Outer dressing changed; posterior wound apparently clean. Slight moisture in the canal; small amount of boric acid insufflated.

August 15—Middle ear dry. Packing removed from the mastoid wound. The cavity was clean and repacked lightly with idoform gauze.

August 17—Mastoid clean and granulating well. Edema persists.

August 20—During the last twenty-four hours patient has complained of severe frontal and occipital pain, requiring morphin. Temperature 99.2°. Patient mentally clear. No dizziness nor nausea.

August 22—At 9 a. m. the wound was dressed and found to be clean and granulating well. During last night the patient complained of severe abdominal pain. Vomited several times during the forenoon and labor pains continued with increasing severity during a. m. Patient delivered at 12:05 p. m. of a premature (dead) child.

August 23—Temperature normal. Complains of headache. Lochia normal. Vulva pads changed s. o. s.

August 24—Morning temperature normal; evening temperature 102.4°. Complained of severe headache during the day. Breasts full, red, and painful. Lochia normal, wound clean. Breasts pumped; epsom salts.

Blood—Whites 20,300.

Polymorphonuclear leucocytes	69%
Small lymph	16%
Large lymph	12%
Eosinophiles	3%

August 25—The temperature is irregular. Complains of pain and soreness of breasts. Breast pump used every four hours. Lochia normal.

August 26—Temperature varies from normal to 102.8°. Severe headaches.

August 28—The septic temperature continues. There have been no chills nor chilly sensations. Heart and lungs normal. Eyes normal. Lochia normal. Breasts red, full, and tender. Severe headache. Patient drowsy. Mastoid wound filling with firm healthy granulations. On deep pressure below the tip of the mastoid there was no tenderness, but a small drop of pus appeared in the mastoid cavity 1½ cm. above the tip and midway between the sinus and posterior canal wall. A small middle ear probe was passed into a minute sinus leading in direction of the jugular bulb. There is no diminution of the swelling which was present at the time of entrance to the hospital. Blood count showed 14,900 whites with 68% of the polymorphonuclear leucocytes.

The question of a septic thrombosis of the lateral sinus and jugular bulb now arose. I advised an exploratory operation, to which the patient consented.

Operation.—August 28—Granulations half filling the original cavity removed with curette. Lateral sinus freely exposed and found to be covered with dark, soft granulations and to be firm to the touch. Bone was removed from the sinus from above downwards toward the bulb.

A small fistula discharging foul pus, and into which a probe could be passed for two-thirds cm., was found just above and leading into the bulbus. Wound packed temporarily.

The internal jugular vein was exposed in superior carotid triangle at level of the cricoid. As it was apparently free from thrombus at this point the vein was ligated. The ligature was above the facial branch. The incision in the neck was closed with interrupted sutures.

The lateral sinus and the upper portion of the bulbus were then freely exposed by removal of the bone with the rongeur. A long incision was made in the sinus, but there was no bleeding, as the vessel was filled with firm blood clot. The bulb itself was filled with foul greenish pus. Bulbus curetted as far as possible. No bleeding from below. No bleeding from upper portion of sinus on compression of the opposite jugu-

lars. The clot was removed with the curette and it was necessary to go nearly to the torcula herophili before there was free hemorrhage.

The wound was then packed with idoform tape, a wick being passed into the bulbus from above.

Good recovery from ether.

August 30—Complains of frontal headache. Temperature remains high—101-102°. Lochia normal. Breasts soft and not sore. Magnesium citrate, q. s. daily. The packing was removed from the lower portion of wound and about a dram of pus found in the bulb; this was removed and wound repacked.

August 31—Temperature has dropped to normal. No headache. Patient much brighter.

September 2—Temperature remains normal. The breasts cause no trouble. No headache. Incision in neck healed by first intention and sutures removed. Packing removed from mastoid wound. No bleeding from sinus and the cavity is granulating well. Light packing. White count, 14,200.

September 6—Patient is gaining rapidly. Mastoid cavity rapidly filling with healthy granulations. Small sinus persists leading into the jugular bulb, which latter is nearly obliterated by firm granulations.

September 9—Temperature remains normal. Breasts soft. Lochia normal. Mastoid wound clean and granulating well. The swelling over the side of the head is slowly diminishing. Discharged, improved, September 11.

The wound was dressed at intervals for four weeks, at the end of which time it had completely healed. The swelling persisted for several months, but when the patient was last seen in March it had disappeared. The hearing is normal.

The following features of this case are worthy of mention:

1. The long interval between the active suppurative process in the mastoid in May and the appearance of symptoms of a serious nature in August, a period of three months, during which time there was an apparent quiescence of serious symptoms.

2. The fact that the middle ear and drum were apparently normal when seen in August.

3. The absence of chills which are looked upon as diagnostic in septic thrombosis of the sinus.

4. I am now convinced that the lateral sinus was filled with an uninfected thrombus at the time of the first operation. This thrombosis causing a backing up of blood in its superficial branches, which was not readily taken up by collateral circulation, gave rise to the marked swelling of the side of the head. There being no constitutional symptoms such as temperature or chills, I did not feel warranted in opening the sinus at this time.

Two weeks later, when the thrombus had broken down and the jugular bulb was filled with pus, the condition was masked by a complicating mastitis, following the birth of the child. The temperature was in no way inconsistent with a simple mastitis without other complications, thus making the diagnosis of a septic thrombosis of the lateral sinus very obscure.

When a patient giving a history of recent acute suppurative otitis media, with or without present inflammation of the middle ear, complains of general malaise and headache (either described as a sensation of pressure or with acute darting pains), has a sudden rise of temperature to 103°+, followed by equally sudden remission, continued over seventy-two hours, with or without chills (a careful differential diagnosis having ruled out other complications), I should open the mastoid, expose and open the sinus. Should there be no objective sign of thrombosis, pack the wound and wait twenty-four hours. If the symptoms continue, ligate and expose the bulb. Given the above symptoms with a bacteremia, I should ligate before opening the mastoid.

When a patient having had a simple or radical mastoid operation has a sudden rise of temperature to 103°+ with remission with or without chills, I have the fundi examined, a numerical and differential blood count made at intervals of twelve hours, a complete physical examination, and in recent cases a blood culture. I wish here to speak of one most important point to be borne in mind in postoperative cases, and that is, that where iodoform tape is used in dressing the wound, you may get an acute iodoform poisoning which will give a typical septic temperature. I have seen a temperature of 105° due to 10 per cent iodoform tape, used in the primary packing of the mastoid.

Should the septic temperature alone continue over a period of seventy-two hours and nothing be found to account for it,

I should expose the sinus, open it, and, in case of thrombosis, ligate. Should there be free hemorrhage, I would wait another twenty-four hours. Should the fluctuation in the temperature stop after twenty-four hours or have occurred only once or twice, and yet a venous stasis were observed in the fundus, or were there an increasing leucocytosis with high percentage of polymorphonuclears accompanied by malaise and headache, or by edema over the posterior region of the emissary, I should open the sinus and ligate the jugular vein. A negative blood culture would not influence me; but in case of a positive culture, I should ligate before exposing the sinus.

The simple mastoid having been performed, the sigmoid portion of the lateral sinus should be exposed by means of the chisel, curette and rongeur. The sinus can then be followed, either backwards towards the torcula herophili or downwards and forwards toward the jugular bulb.

A perisinus abscess being present, you will in all probability find that the bone in the immediate vicinity of the sinus is markedly necrotic and that the sinus wall itself is covered with a mass of more or less firm granulation tissue, varying in thickness up to three millimeters. This granulation tissue may or may not extend beyond the area directly in contact with the necrotic bone; more often it will be found to extend for quite a distance beyond in both directions.

In many cases of acute mastoiditis of streptococcus or pneumococcus infection complicated by thrombosis, it has been my experience to find little or no pus in the mastoid cells, the bone over the sinus appearing intact or at most slightly softened, the sinus wall itself giving little if any indication as to the condition in the lumen. On the other hand, the sinus may be standing out as a firm, red cord and, as I have seen in one case, covered with thin white exudate giving a pure streptococcus culture.

The diagnosis of a mural thrombus or of pus in the sinus from objective symptoms alone is impossible in the great majority of cases; this does not, of course, refer to such cases as may have a fistula in the sinus wall discharging into the cavity. The tactile sense is of little value, the transmission of the cranial pulse being slightly increased in a firmly thrombosed sinus.

The aspirating needle, as advocated by some writers, is of

no value, as it may be readily passed through a mural thrombus and free blood be drawn out, or it may be used above a low thrombus. The only satisfactory means of making an objective diagnosis is that of making a long incision in the sinus wall.

In the few cases where you may think it necessary to explore the sinus before tying, the following procedure may be carried out: Pressure should be applied at or just below the knee of the sinus. This may be done by packing between the cortex and sinus wall, or by means of a blunt instrument. Pressure should also be applied at lowest point possible. A long incision is then made in the wall of the sinus, the lumen of which is examined by direct inspection. A thrombus or pus being found at this point, the wound is immediately packed and the neck operation proceeded with. Should the sinus be found free at this point, the lower pressure is first released, as the infection is more likely to be in the bulb. Occasionally this release of pressure below will "blow out" a small thrombus and a free hemorrhage follow, showing that in all probability the bulb and inferior petrosal sinus are free. On the other hand, should there be no hemorrhage from below or very little, no attempt should be made to probe into or dislodge the thrombus below. This same procedure applies to the distal end of the incision.

A simple incision into the sinus followed by a free hemorrhage is of absolutely no diagnostic value in determining the absence or presence of pus or thrombus in the aural venous plexus, as you may have a thrombus to either side of the incision, or you may have incised the sinus wall and a beginning mural thrombus, which latter is easily overlooked unless the edges of the incision are everted.

The incision should be made with great care and the belly of the knife used, as it is very easy, in an empty sinus, to open through both walls into the subdural space.

Having made a diagnosis of a thrombosis of any portion of the venous sinuses by subjective or objective symptoms, or both, which has given or may give rise to general systemic infection, I immediately cut off that portion from the general circulation in so far as is possible.

This procedure consists in simple ligation of the internal jugular vein. In every one of a series of 125 cases by different operators at the Eye and Ear Infirmary the vein was ligated,

and in no case was there a complete or even partial resection of the vein.

The point of election for ligation is the superior carotid triangle, and above the junction of the facial vein; this allows the facial vein an opportunity to aid in establishing the collateral circulation and shuts off the possibility of transmission of infection to opposite jugular. I have seen two cases with metastases in the lip follow ligation below facial vein.

My procedure in recent cases has been to tie high, first outlining the natural transverse folds of the skin below the jaw and making a small incision one to one and one-half inches in the long axis of one of the deepest depressions, giving cosmetic results as shown in the pictures. This brings up a point of view in the treatment of septic conditions which I do not recollect to have seen alluded to heretofore, namely, the artistic. This does, I will admit, sound as rank heresy in dealing with sepsis, but if we cure our patients and at the same time leave a scar so inconspicuous that it would not be noticed unless attention were purposely directed to it, I think that it is far preferable to the more disfiguring operation.

There is a minimum amount of injury to the tissues, no loss of blood, time consumed in the operation is reduced to ten or at the most fifteen minutes, and the shock as compared to that following the radical resection is practically nil.

The vein being exposed, dry dissection is carried on until the position of the facial vein is determined, a double chromicized catgut ligature is passed under the jugular vein above the facial. The patency of the vein is then easily determined. Separate the two ligatures as far as possible, and by alternating the traction on these ligatures you can demonstrate closure or patency of the lumen, according to the pressure or absence of free return flow of blood.

In the records of the Massachusetts Eye and Ear Infirmary there has been recorded but one case showing a thrombosis below the facial vein at the time of operation. This differs remarkably from the findings of men in other cities, and I can attribute it only to the fact of early operation.

The vein is then ligated with either one or both of the ligatures and dropped back into place. The external wound is then closed by means of horsehair and a fine needle, no drainage being used. In advocating this particular procedure I am speaking from my own cases.

I see no indication for the cutting of vein between two ligatures, as should the blood be infected there is a practical certainty of infecting the neck. Our statistics do not indicate the necessity of bringing the vein to the surface as a drainage tube. This is due to the fact that the pus above the ligature has a free drainage point through the jugular bulb. In only three cases have I seen a continued sepsis due to retention of pus in the vein. In one case the patient, a boy of fourteen, had a marked general septicemia at the time of operation; in this case the neck was reopened and the distal portion of the vein brought to the surface as a drainage tube. The second case had a chill with rise of temperature to 103° three days after operation; on removal of gauze wick from the jugular bulb considerable creamy pus was found; the bulb was washed out by means of a soft catheter, followed by disappearance of the symptoms and an uneventful recovery.

The internal jugular vein having been ligated the packing is removed from the mastoid. The bone over the sinus is removed with a rongeur or gouge, downward and forward toward the jugular bulb, following the suggestions of Grunert. The original incision in the sinus wall is continued and the thrombus or pus curetted out. A small curved curette may be passed into the bulb. A small wick is passed into the bulb and left as a drain. The distal end of the sinus should be exposed by removing the cortex along its course to the point where free hemorrhage is obtained. Carry the incision in the sinus wall backward until the posterior limit of the thrombosis is reached and remove as much of the sinus wall as possible. Do not pass a curette back through the sinus and so try to dislodge the clot, since should you succeed there remains the infected sinus wall filled with fresh blood to thrombose and break down. Remove the external wall of the sinus to the limit of the thrombosis. When you have removed the thrombus, pack the sinus with plain or iodoform tape. The mastoid is then firmly packed with gauze and a firm bandage applied.

This operation is followed, in the early uncomplicated cases, by an immediate cessation of the septic temperature and the disappearance of other symptoms, such as chills, nausea, headaches, etc.

In the presence of an existing general septicemia or pyemia, the symptoms of this condition will of course persist.

Given an apparently uncomplicated sinus thrombosis with

a remission of the septic symptoms after the operation, should the symptoms recur, what conditions must we consider?

In children, always examine the opposite ear.

Acute tonsillitis and other intercurrent diseases, such as ether pneumonia, malaria, puerperal septicemia, acute post-operative parotitis, etc., must be ruled out.

The neck wound may have become septic, either from contamination from the outside during the operation or from the phlebitis; in either case it must be reopened and drained.

Acute iodoform poisoning causes a marked dermatitis, high temperature, chills, dark urine, and at times an urticaria. This is easily remedied by discontinuing the use of the iodoform tape.

Erysipelas is readily made out and treated.

Retention of pus in the jugular bulb, due to the firm packing of the mastoid cavity, has given rise to the symptoms in several cases, the temperature subsiding after washing out the bulb and reestablishing drainage.

In cases showing marked cerebral disturbance it is not uncommon to find that the thrombosis has continued posteriorly even as far as the torcular herophili. I have found this condition several times, and in two cases have been obliged to remove a clot at the junction of the lateral and the other sinuses in the torcular. Both made an uneventful recovery.

Metastases may be carried into the general circulation before operation; during operation due to manipulation of the thrombus before ligation of the vein, or after operation through the compensatory channels. Metastatic infection may take place in any portion of the body, the joints being the more common. Empyema is not uncommon following septic foci in the lungs. These metastases are always manifested by local symptoms.

Meningitis, when secondary to sinus thrombosis, is usually basilar, and the source of infection is a septic infection of the superior petrosal, in the great majority of cases. I have seen this condition in every case autopsied, when death was due to meningitis secondary to sinus thrombosis.

It is surprising that we so seldom find a septic labyrinthitis secondary to a septic infection of the jugular bulb, since the cochlear vein empties directly into the bulb and must necessarily be infected. The same applies to septic labyrinthitis.

Extension of the thrombosis to the cavernous sinus is not

common, but two cases having occurred at the Massachusetts Eye and Ear Infirmary during the last ten years. Treatment of this condition is of no avail.

SUMMARY.

Number of cases analyzed 73

Sex—
- Male 48
- Female 25

Ear—
- A. D. 49
- A. S. 24

Condition—
- Acute 56
- Chronic 17

Temperature—
- Septic temperature 60
- Variable with remissions 9
- No temperature 4

Chills—
- Distinct chills 41
- Chilly sensation 19
- No chills 13

Eyes—
- Optic neuritis 12
- Slight engorgement 7
- No change 54

Blood—
- White count 15,000
- Coll. count 78⅝

Diagnosis made before mastoid operation 32
Diagnosis secondary to mastoid operation 30
Diagnosis made at time of mastoid operation (three sinus wall necrosed) 11
Metastases—Six cases after ligature of vein:

Result—
- Well 61
- Died 12

Cause of death—
- Cavernous sinus thrombosis 2
- General septicemia with metastases 4
- Admitted to hospital unconscious and in extremis 5
- Scarlet fever intercurring during convalescence.. 1

Sinus thrombosis found as complication in following fatal cases:

Tubercular meningitis..... 1
Septic meningitis..... 6
Temporosphenoidal abscess.. 3
Cerebellar abscess 1

These records would seem to indicate that the per cent of fatalities, when we consider the cause of death in each case, has not been increased by the simple operation of ligation. On the other hand, I believe that there undoubtedly are cases which might require the resection.

XXII.

REPORT OF A CASE OF ACUTE MASTOIDITIS IN A CHILD, FOLLOWED BY ACUTE MENINGITIS AND LABYRINTHITIS.*

By Harold Hays, A. M., M. D.,

New York.

On December 23, 1911, I admitted a child to the service of Dr. Robert Lewis, Jr., at the New York Eye and Ear Infirmary. The mother said that the baby (a little girl of eight months) had been fretful for several days, and that the day previous she had noticed a slight swelling and redness behind the left ear. There had been no discharge from the ear.

Examination showed a slight inflammation and thickening over the mastoid, but the swelling was not very tender and there was no fluctuation. Examination of the canal showed no swelling and no pus. The drum was bulging slightly, and there was some sagging of the posterosuperior wall. The child's temperature on admission was 100.4° per rectum.

Although I was not at all positive that a mastoiditis was present, I thought it advisable to do an exploratory operation. The usual curvilinear incision was made, revealing no evidences of inflammation or pus. The periosteum and bone looked perfectly normal. I decided to explore at least into the antrum. On going through the cortex a large amount of pus and granulation tissue was encountered and practically the whole mastoid was destroyed. The mastoid was unusually large for a child of this age, and in the process of removing all pathologic tissue, an area of the sinus and of the dura in the middle fossa, about a half centimeter in diameter, were exposed. In the cleaning out of the antrum and the middle ear the incus was removed. The horizontal semicircular canal was brought plainly into view. Postsinus and zygomatic cells were involved. The

*Read before the New York Academy of Medicine, Section on Otology, February 9, 1912.

operation was completed by closing up the skin wound, all except the lower angle, through which passed a drain into the antrum. A large incision was made into the drum and a dry dressing applied to the ear. A smear from the canal showed a mixed infection; a smear from the mastoid pus showed a few diplococci.

For the following twenty-four hours the child seemed to be fairly comfortable and the temperature ranged from 99° to 100.2°. Then it rose to 103° and the pulse became irregular. In twelve hours it rose to 104.8° and the child was drowsy and stupid. An inspection of the wound was made, the stitches removed and a thorough exploration undertaken, but nothing could be found. The wound was dry and clean. There was very little discharge from the ear. A thorough physical examination was made, but nothing could be found. Then the child began to have diarrhea, passing many greenish stools. I thought possibly this could account for the temperature. The child was given castor oil, an enema, and later calomel.

The temperature continued irregularly from 102.4° to 105° for the three following days, coming down to 101° just before death. During this time a nystagmus developed with the quick component to the left. The child became more and more stuporous. There was no rigidity of the neck, no Kernig sign, the reflexes were not exaggerated, but on December 28th a lumbar puncture was made and a quantity of thick turbid fluid under high pressure, was withdrawn. Smears and culture showed a mixed infection, with the streptococcus capsulatus predominating. A blood count at this time was very peculiar: R. B. C.—4,800,000; W. B. C.—8,800. Large lymphocytes—12.8 per cent. Small lymphocytes—60.2 per cent. Transitionals 8 per cent. Polynuclears—18.6. Myelocytes—.6 per cent.

Examination of the wound a few hours before death revealed nothing except the fact that there seemed to be no vitality to the parts. The child died five days after operation.

There are a number of interesting features to this case. There was never any discharge from the ear, the mastoid cortex looked normal. Although there was extensive involvement underneath, there was none of the usual signs of meningitis except the stupor, and yet the cerebrospinal fluid was under great pressure and turbid, and the blood count was extremely unusual, showing 60 per cent of small mononuclears and only

18 per cent of polynuclears in a total count of only 8,800. There is a great deal of question as to where the original infection through the dura took place. It may have occurred through the diploic veins, through an erosion of the middle ear, through the semicircular canals or through the area exposed in the mastoid wound. I believe that it took place directly through the middle ear. I had seen a somewhat similar case in private practice last spring in a child of about the same age, where there had been no discharge from the ear and examination showed the same physical signs. In this case, within three hours after seeing the child, symptoms of meningeal irritation had taken place with marked opisthotonos, rigidity of the neck, a temperature of 104°, etc. At operation the mastoid was entirely broken down, but no exposed dura was found except at the junction of the aditus ad antrum. The wound was closed and the child made an uneventful recovery.

11 West Eighty-first Street.

XXIII.

A CASE OF PRIMARY JUGULAR THROMBOSIS.*

By Isaac M. Heller, M. D.,

New York.

This patient, Lilly B., aged 7 years, came to my office for the first time on Wednesday evening, April 12th, complaining of severe pain in the left ear, and with the following history: Her father, an intelligent engraver, with his family were the victims of Russian persecution, and during one of their many pograms was given a few days to leave the country. Lilly was then 2 years old and during the flight contracted a severe cold followed by a double otitis media. In October, 1909, three years later, she was taken to the New York Eye and Ear Infirmary, where, on November 1st, on the right side, an acute mastoid was done, exposing the sinus, which was covered with granulations. On the 21st Dr. Dench performed a radical, destroying the labyrinth and cochlea. The result is excellent as to cure, but, of course, with complete loss of function. The left ear continued to run more or less constantly, and it was noticed that she felt best when it was discharging freely. She had been to the Vanderbilt Clinic about once weekly, but although operation had been advised it was refused.

Present pain was of three days' duration and without discharge. The left drum was found to be inflamed and bulging at the posterior portion with the landmarks obliterated. Temperature 102.6°, pulse 120. No sinking of canal walls, mastoid swelling nor tenderness. Hearing was markedly reduced, but no trustworthy tests could be made because she cried constantly, begging not to be operated upon. Caloric and turning tests for labyrinth function were equally unreliable. From the father it was learned she was totally deaf in the right ear and hearing very poor in the left, but that she had been attending

*Read before the New York Academy of Medicine, Section on Otology, February 9, 1912.

school regularly. The drum was freely incised and 10 per cent carbolic in glycerin prescribed with the proper directions.

She returned the next afternoon with the ear discharging, but not very freely; bulging somewhat less and less sensitive. Temperature 100°, pulse 104. Although still quite restless, her sleep was better than it had been. There was no history of chills, and as the family had limited means, I told the father to bring her again next day if she was any worse, but to let me know how she was the day after, or Saturday, the 15th, at the latest. Nothing more was heard until 7 p. m. of the 15th, when the father reported that the patient was quite ill; had had a chill the day before and one that evening. I went to her at once and found her in bed recovering from a chill with a mouth temperature of 103.5°, pulse 130. Drum looked about as when last seen, discharge moderate, no tenderness nor swelling anywhere. Child complained of a little headache, but no ear pain. Mother said Lilly had felt quite well until the evening before, when she had her first chill, and this was her second, which were attributed to malaria. I advised taking her to a hospital at once, and she arrived at Lebanon Hospital at 9 p. m. with a tentative diagnosis of mastoiditis complicated by sinus thrombosis.

On examination at the hospital the blood count showed a leucocytosis of 25,000, with 80 per cent polymorphonuclears. On Sunday the 16th at 8 a. m. the temperature had dropped to 100°, pulse 120, but at noon, following her first chill since entrance, it jumped to 105°. Operation was insisted upon and consent given. It must be made clear that operation was not done sooner because of the parents' fear she would become totally deaf, and it was only after promising to do absolutely nothing unnecessary and to use every endeavor to retain the little hearing left that permission was at all obtained.

At three o'clock we started to operate and at the very first chip of the chisel the sinus was exposed, covered by a layer of bone 1 mm. thick and situated far forward. Chiseling was extended down, exposing the mastoid process to the tip, but not a drop of pus was found. Sinus was now uncovered from knee to turn into the bulb, a distance of 2.5 to 3 cm., and it appeared perfectly normal. Attention was then given to the antrum, which was separated from the sinus by a wall of bone not over 2 mm. thick and contained a small amount of pus.

On retracting the sinus far backward, a drop or two of pus exuded from deep down at the posterior surface of the petrous bone, where the sinus turns to form the bulb. Probing did not reveal any areas of necrosis, and thorough swabbing brought forth no more pus. It was thought that a few drops of purulent material had trickled down here from the antrum, for, as the patient lay on the table, the latter was directly above the former. Nothing further was done here beyond inserting a small gauze drain before closing the wound.

Now to return to the sinus. As mentioned, this looked perfectly normal, but in view of the history, chills, temperature and blood count and so little pathologically had been found to account for same, it was decided to attack the vessel. Under the proper precautions and with a thin, sharp knife the sinus was incised, followed by free, prompt hemorrhage from both ends. It was not thought justifiable to proceed further, so the wound was drained and closed.

At midnight the temperature was normal, but the pulse was 140. At ten o'clock the next morning, the 17th, chill with temperature of 106°, pulse 156, were recorded. Dr. M. D. Lederman saw the patient with me in the afternoon, when the temperature had fallen to 102°. We decided, should there be another chill, to tie off the jugular at once.

At 8 p. m. the house surgeon reported a chill, temperature of 105.6° and pulse of 156. At 11 o'clock, she was anesthetized, and with Dr. Henry Roth assisting the left jugular was exposed, found perfectly patent and apparently normal. Nevertheless it was tied off and severed above the superior thyroid; the lingual and laryngeal branches ligated, but no resection done, as there was no evidence of infection or thrombosis; wound completely sutured. This was all done before the mastoid wound was uncovered, to avoid contamination of the clean parts. Upper wound was now exposed, and on removing the gauze drain leading to the petrous bone above noted, again a few drops of pus were seen, which now unmistakably came from this region. Sinus and dura were retracted as far as possible, and the bone carefully probed and swabbed to determine the origin of the infection, but again no necrosis could be found. Antrum looked well with very little pus therein. On removing the plugs compressing the sinus, free bleeding followed from each end, as was witnessed and agreed upon by

Dr. Roth. The dura near the bulb had a grayish appearance, due to the pus arising from the petrous and presence of the drain. Wound was drained, packed and closed and patient returned to bed.

The chills continued irregularly for almost one week with an up and down temperature and rapid pulse. Heart, lungs and remainder of body normal. Wound was inspected daily, and on removing plugs from the sinus on second day, only the torcular end bled. The drain leading to the petrous was now well saturated with discharge of a foul odor, likened by the staff to that of a gangrenous appendix. On the third day, neck wound was red and infiltrated, so stitches were removed, at once liberating a considerable amount of likewise odorous pus. Canal ceased discharging the next day and remained dry until after closure of the mastoid wound.

And now comes the most curious part of all. Repeated attempts to obtain cultures from the pus in its various locations as well as from the blood were rewarded with negative results except once, where a few staphylococci albi and aurei were found. At least six trials were made on all sorts of media with a "no growth" report each time. We wanted to make and inject an autogenous serum, and felt deeply disappointed at our inability.

Through all this the patient's general condition was far better than one had any right to expect. She had a fair appetite, slept well when free from chills and was without pain or headache. In all there were eight chills in four days after ligating the jugular, and the highest temperature was with the last one, 106.6°, on April 21st. The neck wound ceased discharging pus after three days and went on to an uninterrupted recovery by second intention.

She left the hospital May 6th, three weeks after the first operation.* There was a slight odorous discharge from canal and small granulations can be made out in the region of the fenestrum rotundum, while drum is absent. She is totally deaf, lacking bone as well as air conduction. Labyrinths fail to react to turning and caloric tests. On close questioning, the mother recalls that about two weeks prior to

*Since reporting the above, patient has been seen from time to time, and shows ear perfectly dry, with a large central perforation. She feels well and is an inmate of a special institution.

her first visit, "Lilly was dizzy for one or two days and did not care to leave her bed." Most likely her labyrinth was attacked at this time.

The case certainly presents some unusual features. No one knowing the history and reading the temperature chart can well question the presence of a septic thrombus somewhere in the mastoid region, mild though the infection must have been. My first thought was a clot in the lower end of the lateral sinus, just where it joins with the inferior petrosal to form the bulb. But this would not account for the hemorrhage after ligating the jugular, unless the thrombus were parietal. A more rational hypothesis is a primary process in the bulb itself. McKernon, in his well known article, reports several such cases, but all more acute in course and character. Then, too, the breaking down of the jugular wound bears out this thought, since the infection was certainly from within and not by contamination from without. The superficial location of the sinus with its close relation to the antrum also deserves mention.

The literature is not overburdened with these cases. McKernon was one of the first to call attention to their frequency. His six cases were in children, the oldest being 2 years 10 months. This means undoubtedly a bony dehiscence of the tympanum and direct infection of the bulb without bony necrosis. Laurens, in his thesis of 1904 (Paris), reports four of his own cases and four he had collected. Of the former, the first was twenty-three years, with a discharge for thirteen years, the second, fifteen years discharging six years, the third, twenty-two years, ill since infancy, and the fourth, sixteen years discharging a number of years. Page reported one case, aged twenty years, but did not state how long the discharge had existed. These observations are in accordance with what one might be led to expect on examining the temporal bone. In early infancy the process is rapid and direct. Later, when ossification is complete, it is slow, necessitating an intervening bone necrosis with subsequent bulbar thrombosis, just as we are accustomed to find it extending to the lateral sinus in the usual run of mastoid complications. In this case there was just enough necrosis at the inferoposterior margin of the petrous to show only a few drops of pus in the mastoid wound, probably indicating a much deeper process. Just why the infection should have traveled along this direction rather than

the usual one, through the antrum and mastoid, I am unable to explain.

This experience has called one point to my attention which ought to be emphasized. In general we have been taught that the bulb lies in close relation to the floor of the tympanum. Voss, in his article on "Surgical Exposure of the Jugular Bulb" quotes Zuckerkandl as follows:

"In many specimens of the temporal bone the jugular fossa is not found at the floor of the tympanic cavity, as is generally supposed, but nearer the median wall of the cavity. That the bulb is not infrequently situated far backward or even encroaching on the bone could be corroborated by my specimens. In such specimens the floor and median wall of the tympanum as high as the promontory, were made up of bone which separated the jugular fossa and the carotid canal. Zuckerkandl and others have shown that the jugular vein frequently takes a straight course without forming a bulb or jugular fossa, and that the size of the fossa and bulb is in direct relation to the deviation of the vein from its straight course. It has also been demonstrated that the bulb in those cases characterized by a sharp turn or marked elbow is always higher than the lowest portion of the sigmoid sinus."

Our little patient can talk, showing she has not forgotten her speech. She does not use signs, but reads the lips of her parents and sister. She will be sent to an institution as soon as place can be found for her.

450 Tremont Avenue East.

XXIV.

THE ROLE OF THE LABYRINTH IN IDEAS OF TONE AND RHYTHM, TIME AND SPACE.

By Percy Fridenberg, M. D.,

New York.

This is a general talk upon the interrelations of labyrinthine functions with those of other sensory organs in various somatic and psychic reactions, conscious or subconscious. As in civilization practical need is one of the strongest stimuli to invention and discovery, so in our science the advance of clinical otology and aural surgery has brought with it a more general interest in the physiology of the inner ear. The function of the cochlea to sense sound and to recognize tone was analyzed most scientifically and completely, Helmholtz's great work on Tone Sensation being a monument to modern science and methods of research. Much has been done in regard to the nonacoustic, especially the equilibrational, function in its most direct and important bearing on and interrelation with reflex motions of eyes, head, and trunk. The physiology of the labyrinth is still, however, comparatively young and the many associations which, we may infer, undoubtedly exist between this organ and other parts of the central nervous system and psyche have hardly been worked out. As in civilization the arts and luxuries are the last and highest expression of culture, so in medical physiologic research, the directly useful and applicable is sought for as a foundation for abstraction, comparison, and reciprocal relations. There is a reciprocity of eye, ear, and tactile sense in direction, balance, and judgment of space and time. In this multiplicity of factors there is a mechanism of safety for the organism (Meltzer). The most obvious tone impressions which will naturally occur to

*Read before the New York Academy of Medicine, Section on Otology, February 9, 1912.

us are musical tones, but these are not necessarily the most important, frequent, or fundamental. Noises of all sorts in the outer world were of significance and are still to animals, and to man in a state of nature. The fine structure of the nerve apparatus of the cochlea with each fiber reacting to but a single tone, may be contrasted with the retina and its limited range. Entotic sensations, pulse beat communicated to vessels of the semicircular canals and to the endolymph form a constant stimulation, tonic in character and generally not within consciousness. Indirectly the effect of tone and rhythm may be noted in their influence, conversely, on heart beat and respiration, as well as on bodily motions. Rhythmic motion depends on tone sensations. Influence of tempo in music, the funeral march, the military march, the dance, (love, war) aside from emotional effect. Music at work, yo-heave-ho of sailors, workmen. Cyon's theory is that much finer muscular action is controlled and regulated by mainly unconscious tone sensations. Coordination, as in swallowing, finds its highest expression in motions of larynx, lips, and tongue in song and speech. The relationship of hearing to speech is often looked at rather one sidedly, as if the hearing of the spoken word were the only function. The measurement, gradation, and regulation as to speed, duration, and succession may be of equal significance. No other organ has such a delicate mechanism for the measurement of minute motion, which can be seen only microscopically. Finest difference in tone amounting to micromillimeters are distinguished accurately by the cochlea. Rhythmic sensations are probably the basis of time ideas. Intervals, pauses, rhythm and tact obey arithmetic laws. We hear numerically. The control of eye motion and development of speech control are measured by labyrinthine sensations. The effect of rhythmic exercise (singing, breathing) in certain speech disturbances, such as stuttering, indicate the factor of time regulation. In no way can fine gradations of time be as accurately indicated as by tone and tone sensations. The visual control suggested by the baton of the director of an orchestra is only an apparent contradiction; it is part reflex imitation of visible motion and part reminiscence of acoustic impressions. And then the visible beat rarely indicates a single note or even a single beat, but often a whole bar or larger time space, and serves as a signal for starting the time measure-

ment by hearing. The director himself hears the rhythm before he makes the motion. The latter is practically the only possible signal which can be conveyed at a distance. It could be done much more delicately by acoustic impressions, as in actually singing or playing over, to indicate difficult or complicated rhythm. How could a trill or involved passage be shown by motion? Regulation of rhythm and motion need not depend on conscious auditory impressions. Coordination is just as exact in swallowing as in speaking. It is not improbable that the smallest time unit, the second, corresponds to and is based on the smallest constant and regular rhythmic motion of which we are conscious, i. e., the heart beat, and that the latter may, itself, serve as a measure of time, automatic and generally unconscious. It measures emotions before they enter consciousness, and when graphically registered is free from vitiation by conscious sensations.

Harmonic tone sensations and emotion affect heart rate aside from musical ideas, and, conversely, heart rhythm associated with emotional states depending on hyperemia (increased function, pleasure) or anemia (decreased function, pain) may affect motion and sensation. Love dance and war dance are rapid because hyperemia is required for active effort of killing or procreating. Funeral march is slow because the heart beat is slow from grief, accompanied by sighing or wailing and eventually by slow music. Time flies when we are happy and the heart beats fast. Rapid pulse accompanies rapid motion or even sensations (ball games, races). The emotions themselves are racial memories of former motions, as in battle (anger), flight (fear), and sexual connection (love, desire) which were connected with specific speed of heart action. Small animals have rapid heart action and quick gestures. Now the heart beat itself does not control the rate of muscular action, but the intermediary is given by labyrinthine sensations which again control, excite, and inhibit nerve action. This exact time regulation can hardly be imagined without a mechanism for the conscious or unconscious sensation of number, and it is in the cochlea alone of sense organs that we have such a minutely divided scale. The tone sensations themselves, coming from an infinite field (audition) and capable of infinitesmal subdivision, led to the abstraction of number. This is inherent in the beginnings of music and

is indicated in the evolution of man's thought. Harmony of spheres. Logic, mathematics, music. Symbolic properties of numbers. Relation of tone to length of string, i. e., of auditory to visual constants, was evident. Harmony of numbers and esthetics of equations.

Infinity could not result from touch or sight, which is limited. Field of audition, alone, is unbounded, and the idea of direction, infinite.

Infinity of time is deduced from number, which is susceptible of development, that of space from vision, which is bounded, plus direction, the auditory factor, which has no limit.

Number was supposed to be a product of mentality independent of sensory impressions. Today we are inclined to presuppose for all concepts a rudimentary foundation and gradual growth in the course of ontogeny and phylogeny; in other words, to apply the laws of evolution even to our highest conceptions and faculties.

Geometricians have delicate sense of form and direction, eye and canal concepts. Arithmeticians have the sense of number, eye and cochlea. There are musical and mathematic prodigies.

Selfconsciousness and full conception of a subjective ego follows from abstractions of time and space (external, infinite) and its reference to the zero point of the three coordinates (internal, finite) of the canals. Protected position of ear in skull, complicated nature of nerve terminals in cochlea, geometric arrangement of the semicircular canals in three principal directions or dimensions of space, the dual nature of the nerve supply, acoustic and vestibular, mental effect of loss of hearing, and the mental inferiority of deaf mutes, are all suggestive of a more elaborate and related function than mere sensation of sound and reaction to rotation.

CONCEPTS OF TIME AND SPACE.

Regular return, periodicity, of phenomena in nature and individual life, recognized by animals (hunger, sleep, day and night, seasons) and man (ebb and flow, the day, month, year), and must have suggested early the idea of time. The shortest measure of time known to man is made by him to refer to the shortest, quickest conscious motion he knows, a batting of the lids—clin. d'oeil, Augenblick. Similarly, space objective was made evident to him by concepts derived from sight, touch,

and locomotion. The abstraction could only be associated with a general sense (of time and space) applied to all concepts, visual, tactile, and auditory. So sense of time and space are called general senses or measuring senses.

Time succession is most evident in acoustic impressions (ticking) which have a nonvisible direction. This one dimension is the sagittal direction, corresponding to fore and aft, before and behind. The zero point is consciousness. What lies before us is in the future, what is behind, is past. (Ahead of time; "Backward, turn backward, O, Time, in thy flight"). The ego is the center of time and space. The present, now, equals a point. By moving, it forms a line. Punctum temporis—time to sense a pin prick. Ideas of time are caused by sound not to be confused with ideas of the duration of sounds.

Simultaneity, parallelism, simultaneous function of two parallel canals. Ideas of time and space are not inhibited in sleep, as the labyrinth is dormant by reason, and we are free to fly or fall to infinite heights and depths. Time does not exist, and the incongruence between time and space ideas and dream content is one of the most fantastic and striking experiences.

SPACE

has three dimensions, and three attributes—continuity, homogeneity, and infinity. Direction, infinite and indivisible, and distance or separation, eminently divisible and finite, combine to form ideal space. Aprioristic theory of space, as of an inborn form external of all mental processes, as time was the internal, is inconsistent with evolution. Heuristic or empiristic theory considered space as an abstraction depending on heaped up and accumulated and ordered sense impressions. Of what sense? Touch, muscle sense, sight, eye motions, in turn were tried and found wanting, as they were limited fields, complication with ideas of quality (sights, objects). Tone sensations are independent of this and more original, indicating, at first, direction only. On this one idea space is built up. And space contains but three cardinal directions, depending on three basic sensations corresponding to a system of coordinates, the three semicircular canals. Geometry is essentially a science of space ideas. The propositions of Euclid, which are not susceptible of proof, convince us of their essential truth—they are axiomatic. Why, because they have never been contradicted

in the history of the race and are borne out by the most minute and the most extended measurements. They depend on physiologic perceptions. A point has position, the ego, consciousness. A point in motion becomes a line, a direction. Up and down, right and left, in front and behind, are invariable. There can be no other directions. Animals understand direction. The higher ones move in a straight line when necessary. Bees, insects, do not know a straight line, and move in curves or irregularly. Animals know parallel lines and escape by keeping at an equal distance from a pursuer. They do not run in the opposite direction. A new geometry presupposes more than three directions and a fourth dimension. Valuable calculations are possible by means of this science. Like minus quantity, zero, and infinity, it has no actual existence. Why? Because it is not based on physiologic sense percepts. But our eyes and ears do not see and hear all vibrations. Is it not possible that man in the ages to come will have four semicircular canals and live in a four dimensional space? He will have no place to put it.

XXV.

THE INDICATIONS FOR THE USE OF SALVARSAN IN SYPHILIS OF THE NOSE AND THROAT.*

By J. L. Goodale, M. D.,

Boston.

My experience covers a series of thirty cases at the Massachusetts General Hospital and six cases in private practice. The majority of these were in the secondary stage, and showed the ordinary forms of mucous patches in the throat and mouth. One case occurred of primary syphilis of the tonsils. Six cases were seen of tertiary lesions.

In the presentation of these cases I shall group them according to the reason for administering salvarsan. The efficiency of the preparation is now sufficiently established, and further proof of this statement does not seem required. It is not, however, always easy to decide whether a given case of syphilis shall receive it or whether mercury and iodin shall be given in the time honored manner. or whether, finally, a combination treatment is preferable. I hope that a description of certain typical conditions will bring out in the discussion the views of our members with especial reference to rendering more precise our views regarding the indications for its administration.

A word should be first said in regard to the method employed at the Massachusetts General Hospital. It is given either in a full dose of six-tenths of a gram or in a half dose of three-tenths of a gram. In the first instance the patient is admitted to the wards, and remains there for one or two days after his treatment. In the second case a half dose is given in the Out-Patient Department, and the patient is kept there for about six hours in a recumbent position. Intravenous injection is done into the arm with aseptic precautions. No

*Read at the Thirty-fourth Annual Congress of the American Laryngological Association, May 9th, 1912.

ill effects have so far been noted, although after a full dose chilly sensations and nausea sometimes occur during the following night.

Mercury is usually given in alternating months for a year afterward, usually by inunction. Where inunction is not possible or desirable for social reasons, as in private practice, intramuscular injections of a soluble salt, such as the bichlorid of mercury, are given, and are preferred to the administration of mercury by mouth. If a half dose of salvarsan is given in ambulatory practice, a second one is given usually in six weeks, and in refractory instances a third is necessary a few weeks later.

During the past year the safety of salvarsan has become increasingly manifest, and the tendency correspondingly apparent at the hospital to employ it more and more as a routine measure.

Certain conditions, however, have seemed to me especially to require salvarsan in preferenec to entire reliance upon the former methods. These conditions are the following:

1. Where a prompt removal of infectiveness is especially important, on social or conjugal grounds. Of this class the following case is typical: A young man, married about a year, came to me in March, 1912, with a typical chancre of the tonsils, acquired from a source alleged to be unknown to him. The wife was free from infection, so far as could be determined. Wassermann was strongly positive, and a beginning roseola was present on the skin. The right tonsil was much enlarged with an indurated, flat, ulcerated surface, covered with necrotic débris. It was manifestly extremely important to remove the infection as promptly as possible. Six centigrams of salvarsan were given intravenously. Within a week the tonsil had cleaned up strikingly, and at the end of a fortnight the induration and ulcerated appearance had nearly disappeared. Inunction was then begun and will be continued for alternating months for a year. Wassermann is now negative.

A second class of cases is represented by those with persistent mucous patches in the mouth, where mercury is badly borne. Here we encounter stomatitis, at least in part mercurial, and often difficult to control, requiring the iodids with local applications of dilute chromic acid, and continually re-

curring in spite of all our efforts. This type is illustrated by a man coming February 24, 1911, with mucous patches on the tonsils, and pyorrhea alveolaris. Under mercury, the throat lesions promptly disappeared, but mercurial stomatitis apeared, requiring omission of the mercury. In January, 1912, Wassermann was positive, and a half dose of salvarsan was given. Mercury was again given, with recurrence of stomatitis. In March he received another half dose. Wassermann is now negative, but the pyorrhea persists.

In a third class, especially in outpatient work, secondary lesions continually recur, whether from especial severity of the disease, or from neglect of treatment. As an instance, a man came in April, 1911, with syphilis of five years' duration, having had treatment intermittently, and showing still mucous patches of the tongue, with smooth atrophy at the base. Mercury and iodid of potassium was given at the hospital, but on January 27, 1912, the Wassermann test was still positive. Salvarsan was then given, and repeated in a month. On April 1st Wassermann was negative, and the throat normal, except for the smooth atrophy, which will, of course, remain.

In a fourth class we wish to use salvarsan for the purpose of ascertaining the nature of a given lesion. We may, for instance, know that an individual has syphilis, and yet we are confronted with a swelling or a new growth in the throat or nose, where we cannot exclude the possibility of a sarcoma or carcinoma, or even simple hypertrophy. The excision of a specimen for microscopic examination may not be desirable or even practicable. The element of time may also be important. In a swelling of the septum or of the nasal bones a few days may make all the difference between control of a gumma and its caseation, with deformity of the face. Further, the therapeutic test with mercury and the iodids may leave us in doubt, or their efficiency may not be sufficient to cope with rapidly advancing infiltration. These various conditions are represented by the following case of tertiary syphilis, referred to me by Dr. F. C. Shattuck:

A woman, the wife of a sea captain, came November 17, 1911, complaining of severe pain over the right eye of six weeks' duration, with a numbness for two days below the eye, extending over the cheek. The septum showed a symmetrical, firm thickening at the junction of the quadrangular car-

tilage and the ethmoid plate, covered by smooth, pale mucous membrane. The right middle turbinate was much enlarged and showing considerable edema. The region of the cheek supplied by the infraorbital nerve was anesthetic to the touch. The patient stated that she had taken five years before some medicine in drops for a periostitis of the left upper jaw, with recovery. She was now given sajodin, 7½ grains, and protoiodid of mercury, one-sixth grain, three times a day. On December 1st the ethmoidal and septal swelling had much diminished and the numbness and pain had disappeared. On January 2, 1912, she reported, stating that she had been doing well until ten days previously, when severe general headache appeared, together with a return of the numbness over a smaller area. There was now no supraorbital pain. The right middle turbinate showed now general disorganization, with beginning necrosis of the bone. The septal swelling was manifest, but slight. Four days later a diffuse, periosteal swelling appeared over the left cheek. A full dose of salvarsan was then given. Within a week her headache had disappeared and there was less thickening evident over the left antrum. The right middle turbinate showed a marked diminution in size, with a clean, moderately edematous surface. A month later numbness was present below the right eye, but otherwise the patient felt entirely well.

A fifth condition indicating salvarsan is found in certain types of tertiary syphilis. While the ordinary gummi usually yields a prompt response to the iodids, yet we find at times on the dorsum of the tongue, in the larynx, and on the septal cartilage, more superficial tertiary lesions, relatively slow in development and exhibiting a protracted course. These cases appear analogous to the slow moving superficial serpiginous gummata of the skin. The following is a typical instance:

A man came to the clinic August 17, 1911, with a history of syphilis acquired two years previously, and showing papules on the skin and patches on the tongue. Mercury was given by inunction, but on October 21st the Wassermann was positive, although the lesions on the skin and tongue had improved. Inunctions were continued, and by November 25th all the lesions had disappeared, with the exception of a sore, ulcerated area on the tongue, which had invaded the submucous tissue, and had the aspect of a superficial aggregation

of gummata. In spite of continued mercurial treatment and chromic acid applications, no improvement was noted in the ulceration. On January 4, 1912, a half dose of salvarsan was given. The sore was persistent through the following month, and on March 14th a second injection was made. Healing now began rapidly and in twelve days was complete. Examination on April 24th showed a scar on the tongue corresponding to the ulceration, but otherwise nothing abnormal.

The clinical results following the use of salvarsan appear to me comparable to those following the intramuscular injection of mercury, but more immediate and much more powerful and lasting. While with mercury we may count with reasonable probability upon the melting away of active syphilitic lesions, with salvarsan, on the other hand, the elements of doubt and delayed response appear eliminated. Particularly in the indolent tertiary type, and in the malignant forms of syphilis, salvarsan shows its most brilliant results, and occupies a position far superior to the older modes of treatment. As to its power to effect a cure, opinions are not yet unanimous, but the weight of evidence justifies the statement that salvarsan in repeated doses and in association with mercury offers the best hope of attaining this result.

XXVI.

PRESIDENT'S ADDRESS.*

By James E. Newcomb, M. D.,

New York.

Fellows of the American Laryngological Association:

For the third time in our history the Council has seen fit to meet here in this city by the sea. On this, the occasion of our thirty-fifth annual meeting, it is my pleasure to greet you with great cordiality. As an association we have passed the limit of age allotted to one generation of men. Our series of annual scientific gatherings, as attested by our published transactions, has been unbroken. Our limit of Active Fellowship has gradually risen from thirty to one hundred, and many still knock at our door.

It cannot be said that during the year just elapsed there have been any startlingly new discoveries in our branch of the medical field; rather has there been a steady clearing up of ground already occupied. Another international congress in our special field has been held, and the association was formally represented by Dr. Simpson, who will report to us at the present session. In addition four other members were present.

One action taken at the congress calls for special mention. A motion made by Dr. Alexander of Berlin called for a collective investigation along national lines on the subject of atrophic rhinitis. It was felt by some of us Americans present that this was not essentially an American disease, yet we thought that the committee in Berlin which had sent out a call for an American opinion and had appointed our colleague, Dr. Emil Mayer, the American representative on the committee, deserved a courteous response. Accordingly, after

*Address at the Thirty-fourth Annual Congress of the American Laryngological Association, May, 1912.
May 9th, 1912.

consultation with Dr. Mayer, I appointed Dr. J. W. Gleitsmann, Dr. Robert C. Myles and Dr. Harmon Smith to act as a committee with Dr. Mayer to represent the association in any work that might be undertaken. I presume that Dr. Mayer's paper, scheduled for our closing session, will acquaint us with the present status of the question.

At the outset the association, in Emersonian phrase, "hitched its wagon to a star." It has never lost sight of its high ideal. In 1879 Elsberg enumerated twenty-five men who might be looked upon as the laryngologists of the United States. Of these, two taught laryngology exclusively. All the others included some other branch, generally the ear or chest, in connection therewith. In his opening annual address Elsberg stated the goal of the proposed new organization as follows:

First, a more intimate personal acquaintance among the Fellows; second, stated meetings for scientific discussion; third, the establishment of the then sadly needed desideratum, a proper nomenclature of the various structures embraced in our specialty, and for the various diseases to which they are subject; fourth, the offering of a prize for original research; fifth, the preparation of official reports on important topics taken up by itself, or referred to it for the information of the general medical profession; sixth, the appointment of a committee to prepare a digest of the progress of laryngology reflected by the publications pertaining to our department; seventh, the collection of a special library; eighth, the endeavor to create an influence which should secure instruction in our department by thoroughly competent men in all schools of medicine, men whose whole study and practice are devoted to it.

Elsberg was certainly a man of broad vision, a wide outlook and painstaking spirit in all he set out to do. As Dr. E. L. Shurly wrote of him in his address as president of the association, a quarter of a century ago: "Although of genial yet enthusiastic temperament, he was sharp and incisive in debate, with an insight so critical as to be able to detect the slightest inconsistency or defect in the statement or work of a colleague, and with a mind powerful or courageous enough to broaden such defects into chapters of instruction." A noble tribute of one large hearted man to another. Some of you knew Dr. Elsberg personally. To those of us of a later day

his name, though cherished and his work though enormous and epoch making, are merely historical. Let us see to it, gentlemen, that we are worthy of the heritage he has left us.

It remains for us to ask how his original and ambitious aims have been carried out as the years have flown by. Let me answer seriatim: The intimacy of acquaintance has been, by universal testimony, ideal. Sessions for scientific discussion have been held in unbroken annual sequence. After a lapse of some years a committee on nomenclature has been appointed and has submitted its report. Its universal acceptance awaits coordinate action by sister societies. It is difficult to make it entirely satisfactory to the United States Government officials who conduct the Bureau of Vital Statistics, for they take cognizance only of diseases which may prove fatal, which is not the case with many of the maladies which fall to our lot.

A prize fund has been received from Dr. de Roaldes and arrangements made for the award of the prize. I would call your attention to the fact that the fate of our sister society in finding essays worthy of the receipt of prizes offered by it has not been at all encouraging. The preparation of official reports on professional topics coming before us has been practically provided for by the annual publication of our Transactions. The great growth of current literature, particularly of the abstract departments in the various journals, has rendered the appointment of a committee to report on the progress of laryngology needless. A library has been established and after various migrations is securely housed with the surgeon general of the army at Washington, accessible to our members. I would suggest the advisability of the publication of an inexpensive catalogue with annual additions. The last catalogue was issued by Dr. French, the then librarian, in 1886-87. Lastly, no reputable medical school is without special instructors. If we allow for the change between the conditions of to-day and those of thirty-four years ago, I think we can well say that the ambitious projects of Elsberg have been well fulfilled and that we have been reasonably faithful to our trust.

The motto of the association is "Docendo discimus." We learn by teaching. The unique peculiarity of our Fellowship is that we are practically all teachers, either in the stall or at

the bedside. The spirit of this motto has always been made much of by us. The oldest of national societies devoted to the study of throat and nose diseases properly chose a motto implying appreciation of its duties and obligation to the general medical profession. Various of my predecessors in the presidential office have spoken at length, expressing sympathy with this view. In 1882 the late Dr. F. I. Knight thus wrote: "If the student neglect to acquire some practical familiarity in the use of the laryngoscope while attending the hospital, he will probably never make the loss good afterward." Quoting further from Dr. Knight: "Our special concern is to consider how we can promote the teaching of laryngology in the schools in a sufficient amount for the general practitioner." I think it well for us to emphasize this point as each fall we come into relation with a new class of students. We shall not unduly magnify our office by so doing.

As near as I can learn, those actually present when the association was founded numbered 21. To them were added the names of eleven other gentlemen, and at the first annual meeting, June 12, 1879, a motion was carried, "That every Fellow of the American Laryngological Association at this date be declared a Founder." By the constitution the Active Fellowship was limited to 50. Later it was increased to 60; still later to 75, and finally to 100, its present limit. It now has 87. Of the original Founders seven are yet with us, and we hope they will long continue with us. As a matter of fact, they are all eligible for the new class of Retired Fellows provided for in the new constitution. As far as I have been able to learn, there is no demand on the part of the present Fellowship for an increased limit of the active list above the present number. It is true that a former president has said: "It seems a question whether we have a right to exclude from our membership, whatever be its limit, anyone who by the character of his work has shown his fitness to be one of our Fellows." But this opens a large question. Of the present 87 Active Fellows, 21 are eligible for the Retired list, and under the provision of Article X of the proposed new by-law, are exempt from discipline of the Council if they do not attend or furnish a paper for three successive meetings, i. e., their exemption being based upon their twenty years' standing as Fellows. Hence the association must depend for its work-

ing force upon 87 less 21, or 66 men. During the years since 1900 the Council has been lenient in enforcing this provision of the by-laws. Of course, the number of contributions varies from year to year, although we have always had an attractive program, but from an experience as secretary, which through your recurring courtesy has been nearly twice as long as that of any of my predecessors, I have remarked a growing reluctance on the part of some to contribute to the program, though they are regular in attendance and cheerfully take part in our discussions, yet when approached on the subject of papers, get that familiar clinical condition known as "cold feet." They say and we know that their interest in the association and its work has not waned, but realize they have simply become less active in all their society activities.

Almost every one of my predecessors in the presidential office has referred to the fact that we are the oldest national body devoted to the study of nose and throat diseases. In estimating the relative position the association holds today among kindred bodies, the changed condition of affairs between 1878 and 1912 must be taken into account and looked squarely in the face. As long as the association had the field to itself it went on with its initial velocity and enthusiasm, but it cannot live on alone or rely on that for continued existence and activity. Gentlemen, we cannot live on our pedigree, pure though the strain may be. In every organization, as old as ours, stagnation inevitably ensues unless new blood is from time to time infused. Where shall that new blood be found? The incorporation of the ear and its diseases into the field covered by so many laryngologists renders it the exception and not the rule to find any new man eligible in the judgment of the Council who is not already a member of some national organization whose work is akin to ours. The establishment of the American Otological Society antedates our own. Yet you may be surprised to learn that no less than twenty-four of our Active Fellows are affiliated with it. In 1896 the American Laryngological, Rhinological and Otological Society was formed on the same general plan as our own, but having Eastern, Middle, Southern and Western sectional meetings in addition to its annual convention, with an unlimited membership, and selecting, unfortunately for us, a name in some respects strongly suggestive of our own, as indeed

they had a perfect right to do. As you will recall, we all were courteously invited to join. At the present date very nearly half our number belong to both organizations. Then there is the American Academy of Ophthalmology and Oto-Laryngology, originating in the west, on whose list of members, I am told, although I have not seen it, we have a generous representation. Finally, there is the Section of Laryngology and Otology of the American Medical Association with its unlimited membership. These various organizations offer between them a national forum for everyone. We all of us agree that there are too many societies. Some of us are getting to a time of life when the tendency is to lighten rather than to increase the burdens of society memberships. It is, I repeat, getting hard to find a new candidate with proper credentials who is not already a member of some society kindred to our own. We cannot expect him to absolve himself from all his old obligations simply because he assumes new ones when invited to come with us. As the members of the Council of the last eleven years well know, I have frequently expressed my conviction when the question of candidates was before us, that a man's standing and excellence as an otologist are not the necessary credentials for the American Laryngological Association. Union of our association with any other I would strongly deprecate, although realizing that joint sessions may be, and in fact have been, held with mutual profit. Our aim embraces the consideration and promotion of all that concerns the diseases of the upper air passages. Surely an aim broad enough to call for our best efforts and most assiduous zeal. Many problems which we have often considered and perhaps partially solved, yet confound us. The association was christened the American Laryngological Association. It has met annually for thirty-five years without a break. The same number of printed volumes of Transactions lie upon the shelves of our libraries. The future historian of laryngology in America must resort to its records for authentic facts, especially of the early days, for they are found nowhere else. The 757 papers already presented to it embrace practically all the important discoveries that have been made in our own field. Indeed, in no small number of instances the particular papers have been chosen by their authors as the medium of giving out new truths to the general profession.

They may be read by us all with profit. Let us cherish them. Let the name bestowed upon us by our godparents at our birth be kept inviolate. Let there be one laryngological association devoted to nothing else.

It is a matter for mutual thanksgiving that our active fellowship has been unbroken by death during the year now closing.

We chronicle the lamented demise of two of our former active fellows, Drs. Ives and Van der Poel. Dr. Frank Linsley Ives was elected in 1882 and died March 23rd of the present year. He resigned on account of ill health in 1910 and gradually withdrew from all professional activities. His name will be remembered in our Transactions by a single paper submitted in 1885 on "Submucous Laryngeal Hemorrhage Complicated With Cyst." At one time he was a member of the clinical staff of the New York Eye and Ear Infirmary. He was a good clinician and a courteous gentleman, and will be greatly missed by his many friends. Of recent years he had rarely attended the annual meetings of the association.

Dr. Samuel Oakley Van der Poel was elected in 1888, resigned in 1905, and died April 22nd of the current year. Of late years he had become the senior medical director of the New York Life Insurance Company, and had become engrossed with the laborious duties of that responsible position. An index of Transactions shows him to have contributed two papers, one on a case of "Myoma of the Epiglottis" in 1890 and one on "Some Observations on Laryngeal Tuberculosis" in 1896. For some years of his active laryngologic life he was connected with the Manhattan Eye and Ear Hospital in New York City. Since 1893 he had not met with the association.

We have also lost one Honorary Fellow, the courtly man, the skilled scientist and the learned professor, Bernhard Fraenkel, of Berlin. Little did those who saw him in Berlin presiding so vigorously at the International Congress in August last, anticipate his so speedy demise. He had had an illness just before the opening of the Congress, and for a while it was feared that he would be unable to preside over its sessions. He rallied, however, opened the Congress as per appointment, attended all of its sessions and the day social

meetings, was in firm voice and apparently fully recovered. In a call on him at his residence, two days after the Congress, I spent a delightful hour. He spoke with great pride of the conclusion of the twenty-fifth volume of his "*Archiv fuer Laryngologie,*" the final pages of copy of which he had sent within a few days to the printer. It is too soon after his death for us to appreciate properly his standing as a scientific man. He was born in 1836, and graduated from the University of Berlin in 1859. Ten years later he made, in association with Cohnheim, in Virchow's Pathologic Institute, valuable studies on tuberculosis. At the close of the Franco-Prussian war, in which he took part, he returned to Berlin and became a Privat-Docent in Rhino-Laryngology. In 1873 he established a private clinic, which he continued till 1887, when, upon the establishment of a government clinic in those branches, he was appointed its director. In 1873 he had become connected with the medical service of the Augusta Hospital. He thus laid a solid foundation for the special work of his later years, an ideal course for the specialist. His professional activities continued till the close of his life. He bulks so large in our minds as an editor and as one associated with public hygienic movements that we are apt to forget the valuable laboratory work of his earlier years. He has also the credit of being the first to cure permanently a case of laryngeal cancer by endolaryngeal operation, and for many important discoveries in tuberculosis. It is a pleasing thought that he has been succeeded in his university chair by another of our Corresponding Fellows, Professor Gustav Killian, called from Freiburg-im-Breisgau, from whom, in his new position of larger opportunity and greater usefulness, we may expect a continuation of that marvelous mechanical ingenuity and scientific skill which have already solved for us some of the intricate problems of the clinical surgery of the upper air passages. To Fraenkel the words of Cato to his friend Scipio and Laelius, as recorded by Cicero's "De Senectute," are well applicable: "As I love to see the fire of youth somewhat tempered by the gravity of age, so am I equally pleased when I see the phlegm of age somewhat enlivened by the vivacity of youth, and whoever unites these qualities in his character may indeed have the mark of years in his body, but will never discover the same in his mind."

The principal item of executive business before us at the present session is the adoption of a new constitution and by-laws. At the Congress of 1910 a committee, consisting of Doctors Coakley, Coolidge and Swain, was appointed to consider the question. They submitted a report last year in Philadelphia, but the president of that year, Dr. Kyle, ruled that permanent action thereon must be deferred till this year. In the meantime copies of the proposed document have been ordered printed and submitted to you. Presumably you have read them, and we are now ready for final action. The association has been incorporated. Articles of incorporation are printed in the Transactions of 1910. It is now empowered to hold funds. It is to be hoped that the generous example of Dr. Johnson may meet with many imitations, and that among the legatees of your respective estates there may appear the name of Laryngological Association. Already the Council has been advised of one generous bequest. The establishment of a new class of Fellows has already been referred to, otherwise there are no notable changes. The numbering of the various paragraphs in the new document renders reference to its provisions legible and easy. Too much detail in regard to matters of associational conduct has been, and in my own judgment very wisely, avoided. It has rightly been judged that in special instances the same common sense which has guided us wisely in the past will so guide us in time to come, as more particular interpretation may become necessary. The treasurer has been made a separate officer. I have examined the draft with much care, and let us spend no time in quibbling over mere verbiage, but let us adopt the document promptly. In my judgment it covers every point which a secretarial experience of eleven years has shown to be necessary.

I may mention one point with reference to which the Council agrees, that an ideal method of procedure is yet to be found. I refer to the nomination of candidates for active fellowship. It is frankly admitted by us all that the present plan does not fulfill all inclinations. The fellowship at large prefer apparently to leave the matter in the hands of the Council, because we get answers from less than one-half the present fellows. It was felt that the list of candidates sent out this year for scrutiny was far from satisfactory. It was felt

by the Council that there were cast against each man thereon sufficient ballots to render it inadvisable to nominate him for active fellowship. In two instances the criticism was such that the names could in nowise be considered. I seriously call your attention as to the proper course to be followed in this dilemma; either it seems to be necessary that you shall all vote in the annual informal ballot, or else shall leave the matter entirely to the Council, thus making of it a virtual committee of membership. This is obviously open to objection, as it offers oportunity for electioneering. If fellows would pay attention to the informal ballot, consider carefully the names on it, disregard personal feeling and bear in mind only the welfare of the association, I believe that the results would be satisfactory. But kindly remember that, following the precedent of the ruling by the Chair last year, no change can be made in the draft you propose to adopt unless it lies over until the next annual congress.

I hope and trust that in its present form it will meet with your approval also. Such action as we propose is always somewhat of a critical time in a society like ours. Our records are free from the records of any controversy. Let the harmony remain unbroken.

I wish in your presence to express my personal obligation to our deserving secretary, Dr. Smith. He has carried on the work of his office wisely and well. Year by year the work of his office has grown, and its activities have expanded. During the first year, from unfamiliarity, the task is especially hard, but from what he has already done I vouchsafe for him a long and successful tenure of office.

And now, gentlemen, I have but a brief closing word. In the year 1900 you deemed my name worthy to be coupled in our history with those of Lefferts and Delavan, C. H. Knight and Swain as the custodian of your records and the guardian of your funds. When I felt compelled, from physical reasons, to retire last year from that office, you conferred upon me the highest honor in your power and, in my judgment, the highest honor in the power of American laryngologists to bestow. For your unvarying kindness and loyal support during these dozen years, I thank you from the bottom of my heart. I am humbly your debtor and shall never minimize, still less forget, the friendships formed and the obligations

I am under. As president I succeed a long line of sterling men of choice souls. May I, in some feeble way at least, measure up to their standard.

I now declare the Thirty-fourth Annual Congress of the Association open and ready for business.

XXVII.

THE REPORT OF A CASE OF MALIGNANT GROWTH OF THE LARYNX, REMOVED BY OPERATION.*

By Francis R. Packard, M. D.,

Philadelphia.

The patient which I wish to report presents the following history: Male, white, aged 50 years, a peddler by occupation, calling out his wares on the street. He presented himself at the Out-Patient Department of the Pennsylvania Hospital in November, 1910, with the history of having had a choking sensation in his throat for a year, with increasing huskiness of voice and a dry cough. He had suffered no pain at any time.

Upon examination with the laryngeal mirror, a growth was seen with a smooth, shiny surface, presenting itself below the vocal cords, in the anterior portion of the glottis. The patient's family history was entirely negative as regards any tumors or other growths, or tuberculosis. He denied specific history, and the Wassermann test was negative. He admitted the excessive use of tobacco. A portion of the growth was removed, and a microscopic examination, made at the laboratory of the Pennsylvania Hospital, reported that it was carcinoma. Subsequent to this, in the month of December, a direct laryngeal speculum was introduced and a much larger piece removed, the examination of which, at the same laboratory, resulting in another report of its being of a carcinomatous nature.

He was admitted to the Pennsylvania Hospital, and on the 18th of February, 1911, was etherized and Dr. Robert G. Le Conte made a median incision in the anterior surface of the throat, extending from above the thyroid cartilage almost down to the suprasternal notch. A large number of smooth,

*Read at the Thirty-fourth Annual Congress of the American Laryngological Association, May 9th, 1912.

fatty masses and small glands presented themselves in the subcutaneous tissues. Dr. Le Conte removed these thoroughly, ligating from time to time the very numerous small veins which were unusually distended. I then assisted him in the performance of a tracheotomy, after which the larynx was opened through its median line, anteriorly, and the growth enucleated from the surface to which it was attached. The attachment was almost altogether on the right side of the inner surface of the thyroid cartilage. After the removal of the growth the larynx was sutured and the tracheotomy tube allowed to remain in situ.

On the 22nd of February, four days after the operation, the tracheotomy tube was removed, and on the 26th, eight days subsequent to the operation, the sutures were removed from the external wound. On the 28th the patient was out of bed, and was discharged from the hospital early in March.

The growth was the size of a very large walnut. After removal, a microscopic examination of the tissues, taken from various parts of the growth, all showed marked carcinomatous characteristics.

The patient has had no recurrence up to the present time (May 2, 1912). He has a voice which, although not useful for the purpose of peddling things in the street, is good for ordinary purposes. His general health is excellent. He weighs 160 pounds, and complains of no discomfort whatever in his throat.

My reasons for presenting this patient's history are as follows:

1st. I do not believe it would have been possible to have removed a growth of this size completely by any intralaryngeal operative procedure.

2nd. The great advantage which was given throughout the operation by the performance of a preliminary tracheotomy. All the subsequent steps of the operation were continued without the slightest danger of suffocation, the ether being given entirely through a tube.

3rd. I believe that one feature which has so far favored a good result in this case was the complete way in which Dr. Le Conte was enabled to dissect out the glandular tissue which was, at the microscopic examination subsequent to removal, found to be also carcinomatous. The necessity for such a

prolonged and extensive dissection is my reason for having the cooperation of a general surgeon in any operation of this character.

Of course, a year and four months is much too short a period to venture to predict that there will be no recurrence of the growth in the throat or elsewhere. Nevertheless, the man has had a year and four months of great comfort, and at the present time presents no symptoms of what was undoubtedly a malignant growth in a dangerous region.

XXVIII.

CAVERNOUS SINUS THROMBOSIS OF OTITIC ORIGIN. RECOVERY.

By Adair-Dighton, F. R. C. S.,

Liverpool.

In looking over the literature on the subject of cavernous sinus thrombosis, as far back as 1883, though I have found some fifty cases of the disease reported, I can find no mention of a single case ending in any other way but fatally.

This fact has made me think that a brief report of a case which came under my charge at the Birkenhead Children's Hospital would be of interest, more especially, as besides the point of recovery there are several other points deserving of notice.

Lilian W., aged 13, first came to the out patient clinic on February 16th, 1912, presenting all the signs of an acute right sided mastoiditis with marked swelling over the mastoid bone and acute tenderness on pressure. Examination of the membrana tympani was impossible, owing to the swelling of the auditory canal and the sagging of the superior wall. Temperature 99.4°. On inquiry from the child's mother, a history of chronic suppurative otitis media was obtained. The onset of the present condition dated from December 25, 1911, since which date she had been treated by a local practitioner by means of drops and syringing.

The child was immediately admitted to hospital, and on the following day (February 17, 1912) a radical mastoid was performed under chloroform-ether anesthesia. At this operation a large diseased mastoid cavity was found, containing a large amount of fetid pus under pressure. After thorough curetting I inspected the bone, as usual, carefully, in the region of the sigmoid sinus, but could find no evidence of disease. The tympanum was cleared out, the ossicles removed and the tympanic orifice of the eustachian tube thor-

oughly curetted. The postauricular wound was left open, the whole cavity being packed from behind, as with such a large amount of pus present it would only have been futile to attempt primary union. During the week following the operation the child was apparently doing well, the temperature never rose above 99°, and the pulse and general condition were good.

On February 23rd (one week after operation) I closed the posterior skin incision under chloroform-ether anesthesia and packed the partially closed mastoid cavity from the meatus.

On February 24th patient's temperature rose to 101°, and on February 25th there was another rise to 102.4°, with no obvious cause. Calomel was administered, and on the morning of February 26th the temperature was normal. This, however, did not last long, as during the day (February 26th) the patient had a distinct rigor, the temperature reaching 104°.

On the following morning, when I saw her, the patient showed all the signs and symptoms of cavernous sinus thrombosis, due to extension, evidently from the lateral sinus. The internal jugular vein could be felt throughout its course, the right eye was protruded, the right upper lid drooped, and there was a dusky haze round the left eyelids. Optic neuritis was marked in both eyes. Having obtained the parents' consent, and having explained to them that in my opinion the child would probably die in any case, I again operated. Under chloroform-ether anesthesia the internal jugular vein was ligatured as close to the clavicle as possible, though it was apparent the disease extended below this. (I did not consider it wise in the condition of the patient to attempt resection of clavicle and lower ligation.) It was then dissected upwards to the tip of the mastoid process and cut, the distal end being stitched to the upper end of the skin incision, which was then closed and a gauze drain inserted. The original mastoid wound was then opened up and the sigmoid sinus exposed by chiseling away the posterior wall of the mastoid cavity. It was very obviously diseased and thrombosed, being of a greenish yellow appearance and hard to the touch. The sinus was carefully separated from the overlying bone, which was then removed as far as one inch from the external occipital protuberance. At this point I opened the sinus and curetted distally, that is, towards the jugular vein, and followed

this by syringing through from the lateral sinus towards the distal end of the jugular vein. After several attempts the lotion commenced to appear at the open end of the internal jugular vein, and gradually I was able to get a full and clear stream through. I then curetted the proximal end of the lateral sinus until I obtained free hemorrhage, when I plugged the whole wound with iodoform gauze and completed operation. Patient was given 8 cc. of polyvalent antistreptococcic serum and returned to bed.

On the following day (February 27th) the patient was obviously better, the purple haze round the left orbit had gone, the swelling of the right eye was less, and the temperature had dropped to normal. The wound was dressed, packing removed, sinus and vein freely irrigated and packing reapplied.

On the next day all the eye symptoms had disappeared, and from this time, as far as the mastoid was concerned, the case went on as if it had been an ordinary unstitched radical. The wounds, both behind ear and in the neck, healed well under scarlet red dressing, so that at the present time (April 18th) there is little if any scar in either position.

But on February 27th a septic synovitis appeared in the left elbow.

February 29th a septic synovitis appeared in the phalangeal joint of the second toe of the right foot.

March 2nd a septic synovitis apeared in the left ankle joint.

March 5th a septic synovitis appeared in the left sterno-clavicular joint.

All these subsided, under medicinal treatment, except the ankle joint, which has caused a secondary stiffening of the knee joint and will require the services of an orthopedic surgeon to effect a cure.

During this time the patient had five doses of 10 cc. polyvalent antistreptococcic serum and ran an irregular temperature, which varied between normal and 102°.

Present condition (April 18, 1912).—The eyes present marked optic neuritis, though the swelling of the discs is about half what it originally was. The postauricular and neck wounds are healed with very little scar. All joints are normal except left ankle joint, which is still synovitic, and the left knee, which is stiff, due, I think, to being kept in the one position of flexion. The temperature is normal, pulse good,

and the general condition of the patient, after such an illness, excellent.

Now there are one or two points besides the recovery to which I should like to draw attention.

First, the apparent latency and then rapid onset of the disease. To all appearances there was no sign of sinus thrombosis of any kind until a week after the primary operation, and then it was fully developed in twenty-four hours.

Secondly, the recovery of the cavernous sinuses. I may be wrong, but it seems to me that the passage of a large volume of water down the lateral sinus, jugular bulb and jugular vein acted as a kind of suction pump, after the manner of Cathcart's bladder apparatus, and sucked the thrombus from the cavernous sinus by way of the superior petrosal sinus, and so cleared it.

Thirdly, the occurrence of all the septic synovitic metastases on the left side, save the minor one. In 1911 I brought forward the theory of position[1] to account for the occurrence of mastoiditis and the intracranial complications of it. This theory depended on the fact that, given an unilateral suppurative otitis media, if the patient lies on the healthy side at night the attic and antrum of the diseased ear form, so to speak, the bottom of a cistern of pus, and are therefore certain to be affected, and the disease has every chance of extending inwards, whereas if the patient lies on the diseased side, the attic and antrum of that side form, so to speak, the lid of a cistern of pus, and so are comparatively unlikely to be affected, and intracranial affections more uncommon, as the pus does not stagnate during sleep, upon them, but drains on to the pillow. I have used this position posture theory in practice with good results in acute cases.[2]

Now in the case under notice the patient, owing to the operation upon the right ear, continually lay on the left side, and so all solid particles and fluids naturally gravitated to that side. May it not justifiably be said that the occurrence of the septic synovitis on the left side was due to this enforced position? If this is allowed, it points, as I have previously shown, to methods of treatment hitherto undescribed.

Fourthly, the healing of the wounds with so little scar. Since I first started using scarlet red I have been more and more struck with the great value of it in all cases that are

slow in healing, or are liable to leave unsightly scars, and in all cases where the posterior auricular wound cannot be closed, or breaks down, I always use it in a strength of 4 per cent in iodoform ointment. I have never seen the smallest trouble arise from it, and, on the other hand, have seen results unobtainable by any other method.

Finally, I think the case shows what results can be obtained by good nursing, and I must thank the Sister in charge of the ward in which the patient was for all her help, without which all my efforts would have been of no avail.

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XXIX.

THE MASSACRE OF THE TONSIL.*

By John N. Mackenzie, M. D.,

Baltimore.

During the past few years I have been repeatedly urged by medical friends to give some public utterance by way of formal protest against the indiscriminate and wholesale destruction and removal of the tonsils, which, far above all others, is the chief and most glaring abuse in the laryngology of the present day. They have been good enough to say that a word might not be amiss from one who has been through the dust and heat of the conflict that has raged around this and other fancies in surgical laryngology which have risen and fallen during the quarter of a century that has just passed away.

One of these friends, a distinguished general surgeon of wide experience, large practice and exceptionally high professional skill, in insisting that I say something on the subject, gave me as his deliberate opinion that of all the surgical insanities within his recollection this onslaught on the tonsils was the worst, not excepting the operation on the appendix. And, indeed, when I look back through an experience of over thirty years, in which I have seen theory after theory, for some of which I have been partially, if not wholly, responsible myself, come and go, materialize and dissolve, I feel that, notwithstanding the fact that I approach the subject with reluctance, with diffidence, with hesitancy—with even timidity, and fully mindful of the truth that we are all liable to error, even the youngest of us, and that nowadays in some quarters apparently age and experience count for nothing, I feel I may be pardoned for saying a few words in what I consider to be the interest of the public health, and, therefore, of the public safety.

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*Read April 24, 1912, before the Medical and Chirurgical Faculty of Maryland.

Let me at the outset be not misunderstood. It is not my object to stir up strife, to impute unworthy motives to anyone, or to arrogate to myself any superior wisdom in the surgical management of tonsil disease.

Nor do I wish to shift to other shoulders all the blame. I, too, in my earlier days, have fallen by the way. Indeed, it was once facetiously said that the street in front of my office was paved with the turbinated bones of my victims.

That there are a host of conditions that call for more or less complete destruction of the tonsil is an axiomatic proposition which is not open to discussion. We have all been taking out tonsils for innumerable reasons ever since we entered our special field of work and we will continue to do so when proper occasion demands it. My contention is simply this, that in selecting our cases for operation we should be guided by a sane and safe conservatism and common sense, and not be carried away by those who, by their precept and example, are fast bringing our specialty into disrepute in the eyes of thoughtful and honorable men.

Many years ago Austin Flint was conducting an examination in physiology at the Bellevue Hospital Medical School in New York. Among the students who came up for graduation was a bright young fellow to whom Flint propounded the following conundrum: "What is the function of the spleen?" And the lad replied that the function of the spleen was to enlarge in malarial fever. To the next question: "What is the function of the tonsil?" the boy declared that the mission of the tonsil was to swell and suppurate in quinsy. "That will do," said Flint, "you have passed a perfect examination, for you know as much about the subject as I do myself." Long before, a distinguished medical luminary on the other side of the Atlantic had said that were he, like Frankenstein, to attempt the artificial construction of a man, he would leave the tonsils out. In other words, at that period, or, as a matter of fact, from a period as long back as memory can run, the tonsil was regarded as a perfectly useless appendage which cumbered the throat, and which, therefore, ought to be gotten rid of. Like its little neighbor, the uvula, it was sacrificed on every possible pretext or when the surgeon did not know what else to do. I remember, a long time ago, in a discussion on hemorrhage after tonsillotomy before a New York society, a

distinguished laryngologist made the statement that he had removed without accident many thousands (I have forgotten the exact number) of tonsils—to which declaration an inquisitive, incredulous individual present, with a mathematical turn of mind, said he had made a calculation which showed that in order to have removed that many tonsils within the limit of an ordinary lifetime the operator would have to average a bushel a day.

This general extirpation of the tonsils that obtained in the early days of laryngology received a rude and jarring jolt when, in the last century, it was proclaimed that the tonsil was physiologically directly related to the virility of the male. According to this luminous conception, which owed its popularity chiefly to the teachings of no less a personage than Chassaignac, destruction or extirpation of the tonsil meant impairment or extinction of procreative power. This doctrine at once made tonsillotomy very unpopular among the male laity; but when the Homeric shock of the battle that raged round this burning question had subsided, and it had been found that there were no facts to support the alleged relationship, then the work of slaughtering the tonsils again went merrily on.

But never in the history of medicine has the lust for operation on the tonsils been as passionate as it is at the present time. It is not simply the surgical thirst from which we have all suffered in our earlier days, just as at a still earlier period we suffered from the measles; it is a mania, a madness, an obsession. It has infected not only the general profession, but also the laity. A leading laryngologist in one of our largest cities came to me with the humiliating confession that, although holding views hostile to its performance, he had been forced to do a tonsillectomy in every case in order to satisfy the popular craze and to save his practice from destruction.

Today the laity, with or without medical advice, insist on entire removal of the tonsil for almost every conceivable infirmity. If I had time to do so, I could tell you some, if they were not so serious, amusing stories in this connection.

I will only relate one. A few days ago a woman brought her little six-year-old daughter to me to know whether her tonsils ought to come out. Her nasal and throat passages were normal.

The child was in perfect physical condition and complained of nothing. I said to the mother, "Your baby is perfectly well, why do you want her tonsils out?" "Because she sometimes wets the bed."

In the annual reports of nearly all the special hospitals for diseases of the nose and throat the number of tonsil removals, as compared with all other operations on the upper air tract and its appendages, is simply appalling. In conspicuous and refreshing contrast to the usual narrative of these productions let me quote from the last report of a well-known children's hospital in this city these words of sanity and wisdom:

"A large and annually increasing number of cases apply for operation for hypertrophied tonsils, or for adenoids. Of these the adenoids practically all need and receive operation with benefit and without injury.

"The recent universal inspection of the throats of school children has revealed the fact that nearly all children at some time of life have more or less enlarged tonsils.

"That most of this is harmless if not actually physiologic, and that their removal in these cases is not only unnecessary but injurious to the proper development of the child is our conviction.

"The rarity of rheumatism or endocarditis in children, while nearly every child has enlarged tonsils, would indicate that their removal is only exceptionally advisable, unless they mechanically interfere with respiration, deglutition, or speech. When this is the case they are still best removed with the tonsillotome uness radical extirpation is necessary for other reasons."

I cannot more correctly express the general attitude on the matter than by quoting the words of Professor Swain of Yale University, in the admirable paper with which he opened the debate on the subject at the last meeting of the American Laryngological Association in Philadelphia:[1]

"When an author speaks of his experience in upwards of 9000 cases, mentioning especially 3000 removed within the capsule within the last six or seven years, the only method which he thinks is really worth the while—he certainly has a right to speak as an expert in regard, at least, to methods. Also, it will be readily deduced that he felt in removing tonsils thus wholly he was not depriving the patients of anything

important. When it is the practice in recent years of many operators all over the country to always enucleate the tonsils as completely as possible in all cases, either children or adults, as a routine procedure, it would certainly seem to argue that in general tonsils are better out than in. The question of relative size, appearance, healthiness of structure or any such matter is apparently never thought of. Remove, anyway, and dismiss the matter as not worthy of further consideration." And, again, "It is a most excellent condition of things to be operating laryngologist to a busy internist, who takes the entire responsibility of removal. Failure and success are alike credited against him, but it is a case of blissful inexactness which I consider deplorable."

Much wild and incontinent talk, for which their teachers are sometimes largely to blame, has poisoned the minds of the younger generation of operators and thrown the public into hysteria. Tonsillectomy, for example, is held out to them, not only as a sure cure for, but as an absolute prophylactic against rheumatism and heart disease. They are told that with the disappearance of the tonsil in man, these diseases will cease to exist. Parents bring nowadays their perfectly sound children to the laryngologist for tonsil removal in order to head off these affections. Tonsillectomy is recommended as a curative during the agony of acute articular rheumatism.

But the origin of the latter disease has recently been traced to an infection of the nasal mucosa following operation. Tomorrow it will come from somewhere else. Those of us who are old enough to remember will recall the story of chorea. Years ago we found the cause of this affection in the nasal passages. When this view, after the usual struggle, had to be abandoned, it was suddenly discovered that the eye was the portal of entrance. Today it has been caught in the tonsil. If we exercise a little patience it will turn up soon in some other organ.

In considering the question of operation on the tonsils, and especially complete removal, we must face the following facts:

I. The functions of the tonsil are, in the present state of our knowledge, unknown.

Whether they are portals of entrance or avenues of exit for infection, whether they protect the organism from danger or invite the presence of disease, whether the pathogenic bac-

teria sometimes found in them are coming out or going in, whether they are manufacturers or storehouses of leuco—or lymphocytes, whether they represent the extreme outlying protective ramparts and that, therefore, their destruction would mean the removal of the battle line against infection from the throat to the neck lymphatics, whether the efferent current of lymph exceeds the afferent in volume or velocity, whether, which seems probable, there is an endless flow of lymph from their interior to the free surface, which, unchecked, prevents the entrance of germs from the surface and washes out impurities from within, whether the organ possesses an internal secretion, sui generis, or whether, in fine, the tonsil structure is in any way essential to the well-being of the individual, are questions which have as yet received no definite solution, but which are full of interest and furnish material for instructive discussion and debate. Until the functions of the tonsil are known the final word on its removal cannot be spoken.

II. Whatever its functions may be, and the production of leucocytes is undoubtedly one of them, the tonsil is not, as is generally taught and believed, a lymphatic gland.

The general ignorance of this fact has led to the useless sacrifice of thousands of tonsils, on the fallacious assumption that their functional activity may easily be replaced by the myriads of other lymphatic glands in the body. The physiologic integrity of the tonsil is of the utmost importance in infant and child life. The gland appears early in embryonic life (fourth month), attains maturity at the end of the first year of infancy, and at or about puberty tends to diminish in size. It does not develop as a lymphatic gland from a plexus of pre-existing lymph vessels in the mesothelium, but as an ingrowth of endothelium from the second branchial pouch and, therefore, in its origin must be classed with the thymus and the thyroid, the former originating from the third, the latter from the fourth, while the parathyroid takes its origin from the third and fourth branchial pouches, all by inbudding of the endothelial lining of the primitive pharynx. These anatomic facts have been recently emphasized by Gordon Wilson[2] of Chicago, who, in a careful study in comparative anatomy, has shown from various relations which the tonsil shows to the pharynx that the tonsil secretes or excretes a substance into the pharynx. The tonsil is present in all mammals, with

a few exceptions, notably the white rat, and its anatomic arrangement is such that no matter how concealed it may be by folds of membrane it always retains communication with the pharynx. Observations made in his laboratory on the carnivora show that in this genus the tonsil is often so protected by folds as to be invisible from the mouth; but there always exists a channel of communication. This is well shown in the lion, where the tonsil lies in an elliptical sac of considerable size, which is so placed that during certain movements of the pharynx the contents may be expelled into the back of the mouth. In other words, we have here a structure which plays a rôle of importance in early life, in addition to its production of lymphocytes, and which necessitates a close relation to the pharynx. This rôle may be of infinite value to the infant in his earliest days of life, but which, as he grows through childhood into manhood, he is able to dispense with.

Now, the first organ to manufacture or store leucocytes in embryonic life is the thymus gland (Jacobi).[3] In view of the origin of the tonsil from the branchial pouch, is it not conceivable, as Jacobi suggests, that it may assume the rôle of the thymus after birth or when the latter gland ceases to functionate or disappears?

III. It is rarely possible to separate the tonsil from its neighborhood during the acute invasion or rapid progress of a microbic or toxic poison (Jacobi).

Years ago Jacobi called attention to the fact that in cases of membranous throat disease whenever the membrane is limited to the tonsil, there is little or no glandular swelling in the neighborhood. If the membrane extends from the tonsil to its neighborhood, or starts at a distance from the tonsil, neighboring lymphatics swell at once.

Again, the treatment of this neighborhood shows its effect almost immediately in the swollen glands. This is especially true of diphtheria, which, when limited to the tonsil, produces less adenitis and constitutional symptoms, and, therefore, is less dangerous. We all remember, too, in the days before antitoxin, how much graver the prognosis was when the membrane appeared in the nose and upper pharynx than when it appeared on the tonsils. Nearly every case died.

IV. The rôle of the tonsils as portals of infection, like all new doctrines in medicine, has been greatly exaggerated. To

state that they are, in certain cases, the avenues through which pathogenic organisms reach other organs is simply to state an incontrovertible proposition, in the light of present-day research. But to make them responsible for the long iliad of woes which has been laid to their account is to remove the whole question from its legitimate place in the region of cold clinical fact into the atmosphere of fads and fancies. Some absorption takes place in and from the tonsil; but it is far less than that which occurs in the more abundant and receptive lymphatic structures of the nose and nasal pharynx. The tonsil, moreover, is not built anatomically as a gateway of infection. I have not time to go into a review of this interesting subject, but will simply quote, with some modification, from a summary by Faulkner, of Pittsburgh (*Medical Record*, July 9, 1910), based on an analysis of observations made by Most, Retterer, Labbé, Hodenpyl, Jacobi, Grober and others, and also refer you to a symposium on the subject of the nasopharyngeal lymphatics and their relation to other parts of the body by Hartz, Poli, Logan Turner and Broeckaert:[4]

"The faucial tonsils are peculiar organs. They possess an anatomic character different from other tonsils and other lymphatic tissues. They are innocent organs with functions chiefly confused by medical literature. Their blood supply is scant and they have almost no communication with the lymphatic system. * * * Their crypts are lined by mucous membrane having the ordinary function of other mucous membranes so far as known. They are distinctly separated from the very active absorptive and bacteriolytic structures of the fauces, pharynx and nose. Their position is a segregated one. Their external deep surface is covered by a dense fibrous capsule which sometimes sends a network of fibrous tissue as outrunners along the tonsillar blood vessels (Hodenpyl), the tonsil contains a system of closed lymph canals in the follicles which do not open into the connective tissue reticulum (Retterer, confirmed by Hodenpyl), diphtheritic membrane confined to the tonsil is relatively innocent (Jacobi). There are no lymphatic sinuses around the tonsil and the nearby lymph current is less active than that of the pharynx at some distance (Labbé). And finally, injections made into the region of the tonsil (not even into the tonsil itself) do not spread like those made into other parts of the nasopharynx (Labbé, Retterer, Hodenpyl, Most and Jacobi)."

Hartz,[5] in reviewing the important experiments of Lenhardt, says: "These experiments would lead to the assumption that the tonsils are frequently infected secondarily to acute infection of the nose and the accessory cavities and the nasopharynx. * * * It is probable that every inflammation of the mucosa induces a swelling, often imperceptible, of the neighboring lymphatic glands of greater or less extent, which, acting as a protective mechanism, inhibits the development of the germ. To the tonsils, which have the function of an open lymphatic gland, may be ascribed a protecting influence against the microorganisms which are ever present in the mouth and nasopharynx, acting, also, as a barrier against their invasion into the trachea and esophagus. On the other hand, it must be admitted that the tonsils are frequently the seat of primary inflammation, and that they are more susceptible to disease than other membranous structures in this region."

The question has two sides, a purely bacteriologic and a purely clinical one. If we consider the vast extent of the area through which infection can possibly take place, and if we follow the lead of experiment and that of the pure bacteriologist to its extreme limit and logical end, we may find that nothing short of the guillotine or the axe will insure the patient against absolute and certain immunity from infection through the throat.

On the other hand, when we consider the fact that there are constantly loitering around the oro- and nasopharynx—this region is the clubhouse of the streptococcus—a miscellaneous crowd of pathogenic bacteria, and when we consider the further fact that thousands of operations are done in these regions every day and necessarily without antiseptic precautions, is it not significant at least that we meet with so little sepsis following their performance?

The chief practical lesson to be drawn from the foregoing facts is that in cases in which the throat, and particularly the tonsils, is apparently the starting point of infection, it is mandatory to examine the entire upper air tract and not be content with appearances that are visible to the eye through the open mouth alone. How many stop their search for the cause at the tonsil and fail to explore the deeper parts of the pharynx, the retronasal space, to say nothing of the nasal passages and

accessory sinuses? This entire region must be reckoned with, and failure to do so has probably sent more than one to his grave. I know of a number of cases of fruitless removal of the tonsil which have only gotten relief when treatment was subsequently directed to the nasal cavities and postnasal space. Not to mention many others, I am forcibly reminded of a case of general poisoning and wrecked health in a young woman in whom I had thought I had traced the source of infection to an antrum maxillare empyema. As there was no escaping pus, my diagnosis was not accepted by the family and attendant, and I was not even permitted to make an exploratory puncture. I am unable to say what operation, if any, was done, as she naturally passed out of my hands. But as she grew rapidly worse, and as the futility of the treatment became apparent, my advice was finally reluctantly and doubtfully taken, the antrum was opened, the fetid contents evacuated and the patient, under appropriate treatment, went on to speedy and complete recovery.

I could tell you, also, of cases in which the tonsil has been held responsible for the morbid condition, and has been partially or completely removed, in which relief has only been secured by the discovery and treatment of disease in the nose and retronasal space. And of far graver, far-reaching and deeper significance are cases of infection in which life has doubtlessly been sacrificed by clinging to the lazy and stupefying delusion that the tonsil is the sole portal of poisoning.

V. The hypertrophied lymphatic tissue of the vault of the pharynx (adenoids) does harm chiefly through obstruction. Restore normal respiration in the child, and in a large number of cases the tonsils will take care of themselves. Even if the glands should remain large, if they are giving no trouble, they may be safely left in situ, for as their growth does not go on pari passu with the growth of the rest of the pharynx, the time soon comes when they become inconspicuous in the fully developed fauces.

VI. The mere size of the tonsil is of itself no indication for removal except it be large enough or diseased sufficiently to interfere with respiration, speech, or deglutition, in which case it, or a sufficient portion, should be taken away without delay. A large tonsil does not mean necessarily a diseased tonsil, nor does a small tonsil always indicate a healthy organ. Tonsils

apparently diseased may consist of normal tissue and, on the other hand, perfectly normal looking glands may be found pathologic microscopically. The tonsil may be greatly enlarged, may extend far down into the pharynx or be buried deeply in the palatine arcade and yet not interfere with the well-being of the individual. Such tonsils are the special prey of the tonsillectomist. If they are not interrupting function, they had best be left alone, for they are doing no harm. The change in anatomic relations after operation is often so great that function is crippled more after their complete removal than it was before. Moreover, it occasionally happens that the resurrection of a "buried" tonsil is followed by the burial of the patient.

VII. A most interesting and instructive part of this subject is the occurrence of tonsil disease, with or without cervical adenitis, from infection from the nasal passages (from pus cavities, operations, etc.) and the improper care of the teeth during dentition. Wright,[6] of Boston, reports a remarkable series of 150 cases in which operation on the tonsils was deferred until after the eruption of the molars, not only in the six, but in the twelve-year period, and when dentition had been completely accomplished the enlarged cervical lymphatic glands disappeared, together with the swelling of the tonsils.

The practical illuminating lesson of these observations is that if, in infancy and childhood, we pay more attention to the neglected nasal cavities and to the hygiene of the mouth and teeth, we will have less tonsil disease and fewer tonsil operations.

Tonsillitis not infrequently follows operations on the nasal cavities, especially if pus be present, or even after a cold in the head. Experimental work along this line would seem to indicate that infection takes place through the lymphatics. Thus, in the carefully conducted experiments of Lenhardt,[7] it was found, among other things, that foreign matter, even when injected into the mucous membrane of one nasal passage, was found in both tonsils in a short time after the injection.

In the permanent removal of tonsil disease, equally good, and in the long run even better, results may be obtained in a large percentage of cases by measures less radical than those usually employed at the present time. Out of a multitude of

examples, take the case of recurring quinsy, for which complete enucleation is done. In this condition it has been found that it is frequently only necessary to thoroughly slit up and shrink the upper lobe of the tonsil. Most quinsies occur in this situation, and the destruction of that part of the tonsil is all sufficient to prevent recurrence. By this method enough of the organ is left to entirely perform its functions, and the ultimate development of quinsy of the lateral columns of the pharynx which follows sometimes complete removal is avoided.

VIII. I do not propose to enter the perennial and monotonous controversy of tonsillotomy versus tonsillectomy. Each operation has its legitimate indications and aims. I do not intend to discuss them. I will only say, in passing, that enucleation of the tonsil (with even the removal of its capsule, if so desired, complete enough for all practical purposes, and this fact should be generally known) practically free from danger, and with equally, and in some instances better results, can be done with the guillotine or one of its modifications. In the majority of cases this procedure will be all sufficient. It is a much simpler method, especially in children, and it is not handicapped by the danger of complete enucleation, with its many accidents and complications, to say nothing of its long roll of unrecorded death. To subject a child to the latter operation, with all that it entails, when we have very much safer and practically just as efficient measures at hand, is, to say the least, bad judgment and unnecessary surgery.

As I see this part of the subject in the light of my own experience, and in the experience and observation of others, the truth is slowly but surely dawning, and at no distant day will irresistibly emerge into recognition, that the socalled complete enucleation—the chief objection to which is that it can never be made complete—except in individuals in whom the organ is totally diseased, is an unnecessary operation in the great majority of cases in which it is at present done, and may be supplanted by many other methods which are perfectly safe and efficient and not open to its many serious objections.

IX. That the tonsil has some important mission to fulfill is furthermore shown from its frequent reappearance after enucleation—a protest, as it were—on the part of nature against the total destruction of its functions, and the vicarious activity of

the neighboring lymphatic tissues when its physiologic properties cease to exist. This is strikingly shown in the case of quinsy of the lateral columns of the pharynx, before referred to, when the tonsil is rudimentary or gone. In the case, too, of infectious diseases whose poison is eliminated by the throat this compensatory action is most marked. Thus in the malignant epidemic of tonsillitis which occurred last year in Boston, in which the disease was not contagious, did not start from a septic focus in the throat, but was introduced through the food supply (milk), after much constitutional disturbance, the whole tonsillar ring, as Coolidge[8] expresses it, broke into flame at once. The patients whose tonsils had been removed did not escape the process in the pharyngeal lymphoid tissue, the constitutional symptoms or the cervical adenitis.

X. The tonsils are phonatory organs and play an important part in the mechanism of speech and song. They influence the action of the surrounding muscles and modify the resonance of the mouth. On the other hand, they may be so enlarged as to cripple both these functions, and should, therefore, be removed, such removal being sometimes a gain to the voice of one or more octaves. In tonsillectomy no one can foretell the amount and character of change in the anatomic relations of the parts, no matter how skillful the surgeon is or how skillfully the operation is performed. The adhesions and contractions left after this operation, even in the best of hands, lead often to deplorable changes in the quality and ruin of the singing voice. I should certainly hesitate long before advising such an operation in a great singer or anyone dependent upon the voice as a means of livelihood. The operation of tonsillectomy is a capital operation, a dangerous operation, and should only be done in a hospital or other place where every facility is at hand to meet the gravest possible emergency. It should only be done by a surgeon skilled in its performance and thoroughly equipped for every accident, and with a mind fully awake to the possible fatality which has so often followed as its result.

XI. One word, again, to those who will fail to grasp the meaning of these remarks. It is not my object to decry in the least degree the many excellent measures which modern ingenuity has devised for the surgical treatment of tonsil affections. No one resorts to them with more alacrity than myself when the necessity for their adoption is apparent.

It is not my purpose to assail operation for definite and legitimate cause, but to warn against the "busy internist," as Swain so aptly terms him, who is too busy to waste his time with such trifles as differential diagnosis or diagnosis by exclusion, and his accommodating tonsillectomist, who, whether he admits it to himself or not, cares less about the cause of the trouble, as he is in the business for revenue only.

We who are teachers of laryngology should wake up to the responsibilities of our position and see to it that our pupils shall not leave our institutions or postgraduate schools until they are taught, on the one hand, conservatism and moderation in the surgical treatment of the simpler affections of the upper air tract, and, on the other hand, thoroughness and completeness when brought into the presence of situations of graver emergency. The problem, though difficult, is not impossible of solution. The cure for the evils I have been discussing is largely educational.

While impressing upon our students the absolute necessity for surgical measures in proper cases, we should at the same time make the dangers of their indiscriminate performance fully apparent. In this way only can we be reasonably sure of accomplishing the desired result. The error of first impression derived from teacher and textbook is often difficult of eradication. In the lecture room, in the clinic, in our daily walks with the student, let us make that first impression a good one.

But equally if not more responsible for the deplorable state of affairs which exists today in the matter under discussion, are the teacher of internal medicine and the general surgeon. When preeminent authority proclaims in lecture and textbook as indisputable truth the relationship between a host of diseases and the tonsil of the child, and advises the removal of the glands as a routine method of procedure, what can we expect of the student whose mind is thus poisoned at the very fountainhead of his medical education by ephemeral theory that masquerades so cheerily in the garb of indestructible fact? How are we to offset the irresponsibility of the responsible? But we hear on all sides—"Look at the results." Results? Here is a partial list from the practice, not of the ignorant, but of the most experienced and skilled: Death from hemorrhage and shock, development of latent tuber-

culosis in lungs and adjacent glands, laceration and other serious injuries of the palate and pharyngeal muscles, great contraction of the parts, removal of one barrier of infection, severe infection of the wound, septicemia, troublesome cicatrices, suppurative otitis media and other ear affections, troubles of vision and voice, ruin of the singing voice, emphysema, septic infarct, pneumonia, increased susceptibility to throat disease at the seat of operation, pharyngeal quinsy, and last, but not least, tonsillitis!

Who, may I ask, is in the better position to advise—the surgeon or practitioner, who, without sufficient knowledge, lightly recommends complete enucleation of the tonsils, or those who have devoted their lives to the study of throat conditions and who come in daily contact with its disastrous and often fatal end results? Formerly it was the nasal septum, now it is the tonsil that is the surgical objective of every beginner in laryngology, and a tonsillectomy is usually his first baptism in blood. This operation is done all over the land by operators of all kinds, and, if the truth were known, with great mortality. The amount of reckless surgery done in this field will never be known or chronicled in the pages of medical literature, but it may be found in its abiding place in the book of the recording angel.

Let us hope that the day is not far distant when not only the profession but the public shall demand that this senseless slaughter be stopped. Is not this day of medical moral preaching and uplifting a fitting one to lift the public out of the atmosphere in which it has been drugged and for the reckless tonsillectomist a proper time to apply the remedy of the referendum and recall.

We are going through today in laryngology what the gynecologist went through years ago. The ovaries were removed then under as little provocation as the tonsils are being taken out today. The socalled "tonsil question" is one of simplicity and comparatively small dimensions when viewed in the light of sanity and common sense, but it has been made to assume formidable proportions by unsound observation and reckless surgery. It has come to a point when it is not only a burning question to the profession, but also to the public. This senseless, ruthless destruction of the tonsil is often so far reaching and enduring in its evil results that it is becoming each day

a greater menace to the public good. Until we have more definite knowledge concerning the use of the tonsils no one can tell the damage done to the children of the present generation or the influence of wholesale tonsil removal on the children of the next. Whatever a more exact examination of the tonsil may reveal as to its function, I believe it was placed in the throat not with evil, but with good intent—to serve a teleologic rather than a pathologic purpose—that its mission is physiologic, and that it was not designed by nature as a natural, easy and convenient avenue of infection. It is, of course, not open to debate that there are a multitude of conditions that call for partial destruction or more or less complete removal of the tonsils; but radical operation should not be done without definite and sufficient reasons. The tonsil should not be sacrificed any more than any other organ, without convincing evidence that it is the cause of the disease to be removed.

Hasty theory, which sees in destruction of the tonsil the only means of treatment, and which, unmindful of the lymphatic and other anatomic arrangement of the neighboring structures and their physiology, and which, losing sight of the further fact that it is hard, if not impossible, to determine during life that the tonsil is the only avenue of entrance in a given infection, throws differential diagnosis to the winds, should have no part in modern scientific laryngology. When we shall clarify the atmosphere of our ideas in this matter, and when sane authority shall demand a halt, then we will hear less of the massacre of innocent organs and have less frenzied literature on the subject.

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XXX.

A NEW KNIFE FOR THE SUBMUCOUS RESECTION OF THE NASAL SEPTUM.

By Gordon W. Rice, B. S., M. D.,

Champaign, Ill.

In doing the submucous resection of the nasal septum I have found in many cases some difficulty in starting the elevation without tearing and fraying the edge of the flap, and in observing other operators I have noticed that they, too, have the same difficulty. This step is tedious and time consuming.

In order to overcome this I have devised an instrument for the purpose of starting the elevation at the same time the incision over the convexity is made.

This knife, shown in Figure 1, is bayonet shaped. The edge at the point is sharp. The lateral edges are dull and rounded, and act as elevators. The short part, at right angles to the shank, is the cutting edge of the instrument.

In using my knife a stab incision is made at the top of the convexity of the deviation. The point of the bayonet passes between the perichondrium and the cartilage, thus starting the elevation (Figure 2).

The bayonet point is then brought parallel to the anterior posterior surface of the deviation, and the incision and elevation continued as shown in Figure 3. The incision being completed and elevation started as shown, the latter is easily continued with the ordinary elevator. The bayonet point is then passed through the cartilage by a stab incision, the finger in opposite side, to guard against perforation. (Figure 4.)

The point of the bayonet now lies between cartilage and perichondrium of opposite side, the incision through cartilage continued and the elevation started. (Figure 5.)

I have found by the use of this instrument the time consumed in completing the operation is materially shortened and the danger of perforation practically nil.

Actual size.

FIGURE I.

Dr. Rice's Submucous Knife.

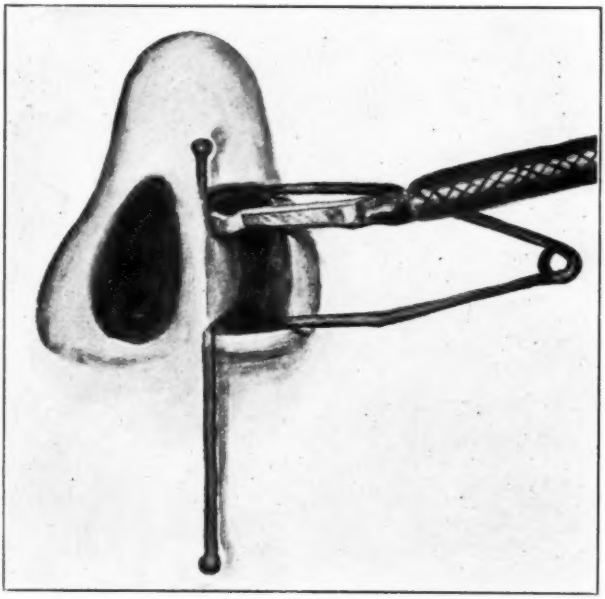

FIGURE II.

First step, stab incision, bayonet point penetrating mucous membrane and perichondrium. Point passes between perichondriam and cartilage, starting the elevation.

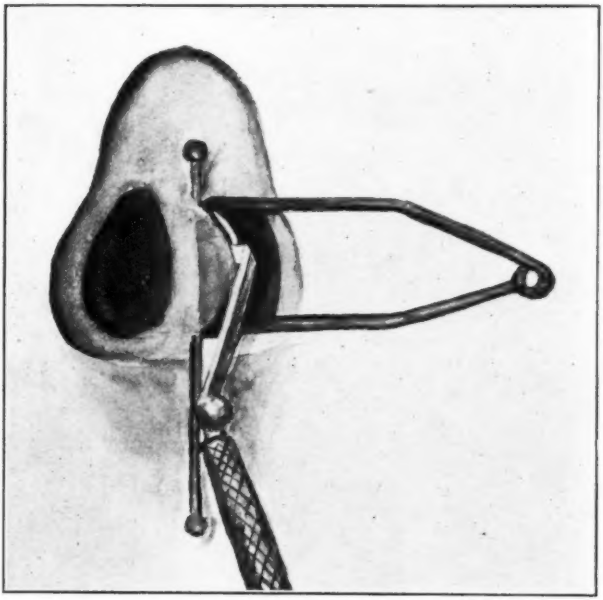

FIGURE III.

Making incision over convexity of deviation. Point of bayonet, remaining between perichondrium and cartilage, continues the elevation, while cutting edge makes the incision.

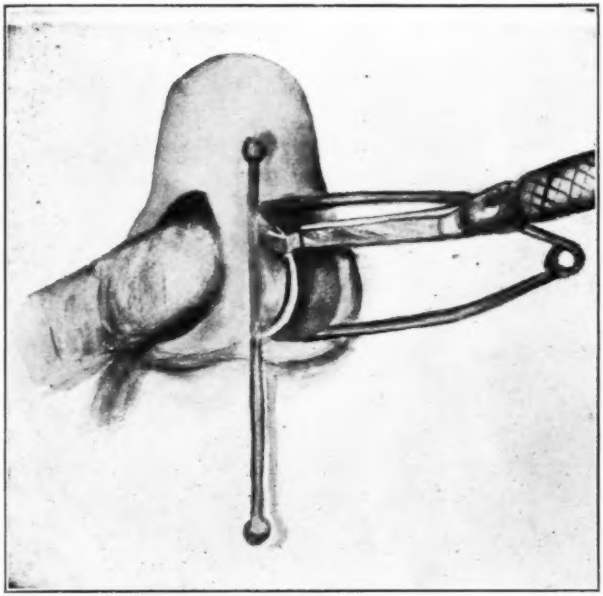

FIGURE IV.

Showing incision through mucous membrane and perichondrium completed. Stab incision through cartilage, bayonet point passing between cartilage and perichondrium of opposite side, latter protected by finger.

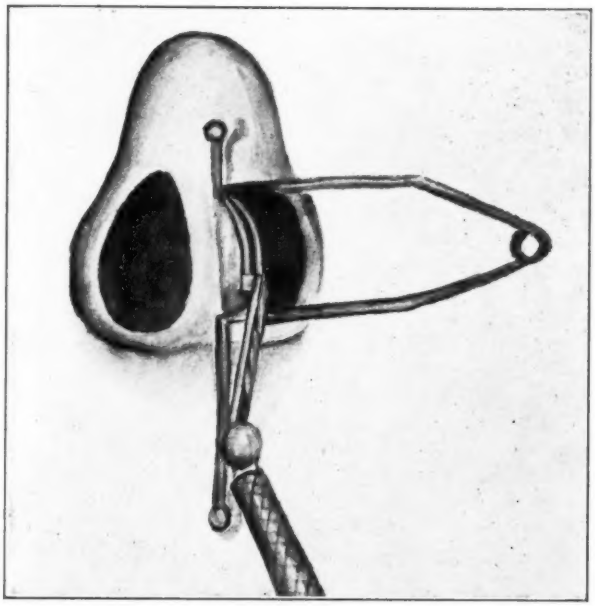

FIGURE V.

Completing incision through cartilage. Elevation on concave side started. Danger of perforation nil.

XXXI.

THE MIDDLE TURBINATED BODY: SOME INDICATIONS FOR ITS REMOVAL.

By W. Scott Renner, M. D.,

Buffalo.

The association of pathologic conditions of the middle turbinated bone with nasal reflexes, nasal polypi and suppuration of the nasal accessory sinuses has been recognized and discussed by innumerable writers on rhinology during the past twenty-five or thirty years. And in 1907 a most valuable symposium on the subject was presented here in Atlantic City, before the Section on Laryngology and Otology of the American Medical Association.

Oculists of today refer many patients to rhinologists for nasal examination when symptoms are found which lead them to suspect intranasal or nasal accessory sinus trouble. The recent literature has led them to believe that their patient is suffering from some sinus trouble. Many of these have no involvement of the sinuses, but conditions are often found in the region of the middle turbinate which produce reflex eye strain, headache, etc. These are cases which would not come under the observation of the rhinologist were it not for the interest that oculists are showing in the nasal cavity as a causative factor of abnormal conditions of the eye.

I do not wish to dwell upon the cases of chronic sinusitis and nasal polypi in which the enlarged turbinate requires removal as a part of more radical operations, but to speak of the importance of the middle turbinate in producing many of the reflex neuroses, and the necessity of its removal for the proper ventilation and drainage of the nasal accessory sinuses, especially those of the anterior group, and thereby preventing the occurrence of the chronic sinusitis.

The turbinated bone becomes important clinically, first, by increased volume of its mucous membrane; second, by its va-

rieties of shape, and, third, on account of its relation to other portions of the ethmoid bone, such as the bulla ethmoidalis, the unciform process, the perpendicular plate of the ethmoid, that is, the upper part of the nasal septum.

The middle turbinated bone varies in type, whether diseased or not. The free anterior border may be so removed from the external wall of the nose that the whole extent of the hiatus semilunaris can be made out by rhinoscopic examination, or it may by its position completely hide the hiatus, or it may be in apposition with the nasal septum.

It may be broad anteriorly and small posteriorly; or, it may be narrow in front and extend far back and be broad posteriorly; or, it may be large in the whole of its extent. It may contain one large or several small cells which open into the interior or posterior ethmoid cells, or it may have an hiatus of its own. Besides these differences in the shape of the bone itself, its surroundings may by their analogous positions press upon it. The septum may be pressing upon it when it is often small in front or throughout its extent. The hiatus semilunaris may be narrow or broad, according to the relative positions of the uncinate process and the bulla ethmoidalis. Both of these processes may contain cells which vary in size. At either side of the uncinate process are the anterior and posterior fontanelles, which have some influence on the appearance of these parts. But the uncinate process and the bulla ethmoidalis may be large or enlarged so as to overlap the middle turbinated bone and be mistaken for it, or have the appearance of a double middle turbinate. The middle turbinate and its coverings, therefore, from its position and relation to the neighboring parts, may or may not prevent free drainage of the hiatus semilunaris and the anterior group of nasal sinuses; or from pressure upon the septum or bulla ethmoidalis, may produce pressure symptoms, eye symptoms and other reflex neuroses. Early attention to the condition of the middle turbinate should prevent most cases of sinusitis of the anterior group of cells.

Of the various reflex neuroses attributed to intranasal pressure and hyperesthesia of the nasal mucous membrane, the most common are eye strain accompanied by headache or neuralgia; "paroxysmal sneezing" and reflex cough, accompanied at times by asthma, vertigo, twitching and spasm of

the eye muscles. Pressure may also produce passive congestion in neighboring parts; pressure on the ethmoid cells, and especially on the bulla ethmoidalis, by an enlarged middle turbinate may produce eye symptoms due to congestion.

The greatest number of cases of reflex disturbance are those in which the patient complains of headache, eye strain, etc., in which the ophthalmologist is unable to find any refractive error, or in which the correction of a refractive error does not relieve the symptoms. The discomfort and ocular pain are increased by use of the eye.

The following cases are illustrative:

Miss C., 29 years of age, consulted me on November 9, 1911. She had had eye trouble all her life, and complained of eye strain, headache and nasal obstruction. I found the right middle turbinated especially enlarged, the left less so. Both lower turbinated bones were covered with pale hypertrophic tissue. I removed both middle turbinates and the posterior hypertrophies from both lower turbinates between November 13th and December 9th. Treatment was followed by relief of symptoms.

Dr. R. R. Satterlee, an ophthalmologist, examined this case and reported as follows:

"Miss C. came to me November 11, 1911. I found right fundus veins swollen, nasal side of disc fuzzy. Left disc normal, but veins swollen and tortuous. Vision: each eye, slightly subnormal with any correction. Weak interni. Reported again January 11, 1912, a month after the operation. Fundi cleared up, veins about normal in size, no tortuosity, better muscular balance. Vision normal with proper correction prescribed."

Miss W., 31 years old, a nurse, consulted me August 26, 1911. She complained of excruciating headaches and eye strain. I found the left middle turbinate especially enlarged and recommended its removal, which was done a few days later and which gave great relief for a few days, when she came back with a return of the pain. An interval of a couple of weeks passed before I removed the other turbinate.

This patient had seen several ophthalmologists and had had a gall bladder operation for the relief of the headache, etc., without any benefit. The symptoms disappeared a short time after the operation.

The ophthalmologist reported in this case as follows: "Miss W. came to me September 5, 1911. I found on examination intense ciliary spasm, engorged veins of both fundi, vision subnormal, abnormally strong interni, severe headache. Was to be operated on, so increased the glasses she was wearing and told her to report in one month. On September 28, 1911, veins less swollen, vision more nearly normal with correction. In December gave full correction, fundi normal, muscular balance about normal. Saw her a month later, headaches all gone, eyes normal in every way."

Other cases quite similar to these have recently come under my observation where the findings of the ophthalmologist before and after operation were practically the same. These, however, are only a few of the many cases whch we all see where the patient has complained of headache and eye strain, especially on constant use of the eye, where the relief from the removal of the middle turbinated bone has been great, but unfortunately no ophthalmoscopic examination had been made in most cases of this class until recently.

The effects of pressure of the middle turbinate upon the anterior ethmoid cells in the production of congestion of the conjunctiva and lacrimal ducts are illustrated by the following cases:

Mrs. W. C. M., 35 years of age, came to me on November 4, 1911, at the request of Dr. Satterlee, for what appeared to be obstruction of the left tear duct, swelling at the inner canthus, excessive lacrimation with redness of the conjunctiva. She said that she also suffered from nasal obstruction and frontal headache. She had been treated by several oculists, who failed to relieve her symptoms. On examination of the nose I found that the left middle turbinate was large, that the bulla ethmoidalis was large on that side, and the mucous membrane over the lower turbinates on both sides was hypertrophied. At the first seance I removed the left middle turbinate and the anterior wall of the bulla ethmoidalis, which contained a very large cell. The eye symptoms were greatly improved in twenty-four hours. I subsequently removed the posterior hypertrophies from both lower turbinates. She has been perfectly free from nasal obstruction, headache and lacrimal irritaton since the completion of her treatment.

A similar case is that of Mrs. S., 44 years of age, who for

some time had been troubled with excessive lacrimation of the right eye, especially on exposure to cold air. She has had nasal trouble for years, and eighteen years ago I removed posterior hypertrophies, but had not at that time considered her middle turbinated of importance. She came to consult me March 11, 1911, upon the recommendation of an oculist. I found the right middle turbinated very broad, long and thick throughout its extent. Removal of the turbinated was followed by a gradual disappearance of the eye symptoms, and she has had no return of them up to the present time. These are not cases of obstruction of the tear duct, such as we expect to meet where the lower turbinated obstructs the nasal end of the duct, but they are of more frequent occurrence in my practice.

At certain seasons of the year patients consult us for acute ethmoid and frontal sinus trouble. This may be the first attack, but most of them have had one or two attacks of this kind in the spring of the year, which disappear under treatment and the patient remains perfectly well until the following year. If these attacks in former years have not taken on the form of a purulent ethmoiditis or frontal sinus trouble, the patient has been subject to repeated attacks of cold in the head coming on after exposure, etc. Most of these cases are found to have large middle turbinated bones on the side of the inflammation.

All cases of acute frontal sinus and ethmoid trouble, when not complicated by the presence of polypi and ethmoiditis of long standing, probably may be prevented from either recurring or becoming chronic by the removal of the middle turbinated bone. An acute attack should, if possible, be carried through the acute stage before the bone is removed. The patient should be kept in bed and all general toxic condition eliminated by free catharsis, alkalines and light diet. Before the discharge has commenced, cold applications should be made externally, and hot applications after the discharge has been established. The hiatus may be kept open by the insertion of pledgets of cocain and adrenalin, if tolerated by the patient. Adrenalin, however, even where much diluted, is an irritant to many mucous membranes. I am more and more inclined to depend upon the rest in bed, catharsis and heat externally for the relief of these inflammations during the acute

stage, and feel that my cases do better where no medication of the hiatus is attempted. The inferior meatus may be irrigated with warm normal salt solution, especially where there is much pus coming down from the upper part of the nose The very severe pain which occurs for a few hours each day should be relieved by the hypodermic use of anodynes, such as codein. The passage of a probe into the frontal sinus or the irrigation of the sinus are contraindicated. When it is possible to irrigate a sinus, rest and heat will cure the acute inflammation in a very short time.

Unless heat and rest relieve the pain and tenderness in from three to six days, I remove the whole of the middle turbinated bone of the corresponding side, under cocain or general anesthesia, and continue the rest treatment without irrigation of the nose. Should this fail (which must occur very rarely in acute cases), I would resort to an external operation. Of course, if there were much involvement of the ethmoid cells of a chronic character, or if there were any polypi found in the hiatus at the time of the removal of the middle turbinated bone, I should remove them at the same time.

I would like to report the following case in connection with the above:

Mrs. H., now 35 years old, first came under my observation nine years ago, when she said she was subject to repeated colds. Removal of the posterior hypertrophies was followed by a rather severe hemorrhage, which prevented her from consenting to any radical treatment, and each attack of coryza was accompanied by severe headache and sneezing, and at such times the right middle turbinated bone was acutely inflamed or at least hyperemic and swollen. The condition was never accompanied by a purulent discharge. The advisability of the removal of the middle turbinated bone was often discussed, but the patient never consented.

On the 1st of February, 1911, she developed an acute sinus trouble, purulent discharge with great tenderness and excruciating pain, which did not yield to any treatment, such as external applications of moist heat, salines and anodynes. On the 9th of February I removed the right middle turbinate, under a general anesthesia, and after another ten days the pain had practically disappeared and the discharge stopped. The patient has not had any return of her recurring coryza, has been

free from headache at the menstrual period, and is well satisfied. The patient had a great deal of infraorbital pain during each attack of acute coryza, which was always relieved by the application of cocain to the anterior end of the middle turbinated bone. Such cases are very numerous, but are always relieved in this way, and it must be but rarely that a case of frontal sinus trouble would become chronic if the middle turbinates were removed.

Severe pain in the frontal region, even when there is much tenderness, does not indicate necessarily that the suppuration is in the frontal sinus. Many of these are ethmoidal with reflected pain. The tenderness may be over an ethmoidal cell, situated high up and bulging into the frontal sinus.

The following cases illustrate the benefit of early removal of the turbinated bone in antrum cases:

Miss U. came with her physician to consult me for what was considered an acute antrum trouble on the right side. She had nasal discharge between the middle and lower turbinates. The right middle turbinate had a very large globular anterior end, which did not press upon the septum, but could have easily directed a flow of pus into the antrum. She had pain and tenderness in the region of the infraorbital nerve. Transillumination, etc., showed that the antrum was clear. I directed the patient to have hot applications externally, and recommended the removal of the middle turbinated as soon as acute symptoms subsided. I felt that she had no antrum trouble. She recovered, but had a similar attack one year later. As she was very anxious to attend to her work, I removed the middle turbinate, which contained a large anterior cell. She was completely relieved of all her symptoms in twenty-four hours and has remained free from trouble since that time.

Mr. C. W. F., age 53 years, came to consult me on September 25, 1910, upon the recommendation of his oculist, Dr. Elmer Starr, for a pain in the head, which he thought due to his eyes. Correction of his vision had not helped him. The right middle turbinate was found to be very large, especially at its anterior end, and any examination of the hiatus, even after adrenalinization, was not possible. The patient would not consent to removal of the bone. One year later he presented himself with a well established case of antrum trouble,

which was completely relieved by irrigation in about three weeks; the middle turbinate was then removed, and has been followed by the disappearance of the headache and no return of the antrum trouble.

Many similar cases will occur to you. These cases have been mentioned to show how an acute antrum trouble may follow an acute ethmoiditis, the antrum simply acting as a receptacle for the pus until an inflammation of the antral mucous membrane is set up.

Among my records of cases of chronic paroxysmal sneezing, I recall several in which the condition was completely relieved by the removal of the middle turbinate bone. The first is that of Miss T., from whom I removed both turbinate bones more than ten years ago, for the relief of hyperesthetic rhinitis and asthma, and for which she received no other treatment. She has had no return of her symptoms.

Another case is that of Mrs. E. G., who consulted me at the suggestion of an ophthalmologist for eye strain and headache. She also complained of nasal obstruction with paroxysmal sneezing. She had been sent previously to a rhinologist, who had said that her symptoms were not due to sinus trouble. I considered her middle turbinated bones large enough to be the cause of them. I removed them both, with complete relief of all her symptoms.

Another case is that of a school girl, 14 years old, who suffered with enlarged glands, nasal obstruction, attacks of cold in the head, hay fever-like attacks, accompanied by asthma. The tonsils and adenoids were removed, which was followed by an improvement of the condition of the cervical glands. Later, posterior hypertrophies were removed, affording no relief to the nasal symptoms. Although this girl was quite young, I decided to remove the middle turbinate bones. Since having this done she has been completely well and finds it easier to do her school work.

These cases seem to demonstrate that there are many in which it is not necessary to look for and treat hyperesthetic spots after the real disturbing lesion has been removed. In all these cases the nasal mucous membrane has, during the sneezing attack, the sodden, pale appearance found in true hay fever.

In marked contrast to these cases is that of a young man

who came under my observation through the kindness of the late Dr. A. A. Hubbell in 1894. At that time he had every six or seven days attacks of excruciating headache, coryza and excessive lacrimation. There was no sneezing; the whole interior of the nose was excessively senstive, and the patient was unable to open his eyes in bright light. The first attack occurred in March, 1888, just after he had apprenticed himself to a photographer; the second attack, eight or nine months later, after which the intervals decreased in length down to once a month, and finally once in six or seven days. This condition I completely relieved by cauterizing the interior of the nose with dilute chromic acid, twenty grains to the ounce. I cauterized especially the surface of the middle turbinated bone and sensitive spots which I found on the septum. This condition, however, returned after a few years, and from time to time since, relief being gained by a similar line of treatment until four months ago, when I removed the right middle turbinated, which was followed by complete disappearance of the symptoms until a couple of days before the writing of this paper, when he returned with an attack confined to the right side—that is, only the right eye and right nasal fossa were affected. This attack followed the general housecleaning and sweeping of his photographic studio. I have always felt that his attacks were caused by some chemical which he used in his work.

It is, however, very different from the paroxysmal sneezing, hay fever and other reflexes produced by external irritants.

When asthma is produced reflexly in nasal trouble, it occurs in one or two forms: The first form is acute in character. It is seen as a sudden attack of dyspnea, which may last from a few hours to two or three days. In the intervals between the attacks all obstructon to breathing disappears. Patients who have been the victims of "sneezing catarrh" and hay fever often develop this condition.

In the chronic form of the asthmatic attacks the patient has more or less difficulty in breathing, which is increased at night, and in which you hear, as well as in the acute form, snoring and whistling sounds in the chest. This is often diagnosed as chronic bronchial asthma, but it is not, for it disappears quickly after a change of climate, or after removal of the cause; such rapid disappearance of the physical signs would not occur in true bronchitis.

Although bronchial asthma is sometimes due to nasal trouble, we frequently have asthma associated with nasal trouble where there is no etiologic relation between the nasal and bronchial conditions; in such cases the removal of the nasal trouble makes the asthmatic more comfortable, for it is a great relief, even in asthmatic attacks, to have the nasal passage free. When asthma is due to intranasal conditions, painting of the nasal mucous membrane with a solution of hydrochlorate of cocain will generally relieve the asthmatic attack. No asthmatic should be treated for a nasal complication without excluding all serious causes of asthma, such as diseases of the kidneys, however much trouble there may be in the nose. In this connection I wish to speak briefly of a case of asthma in the wife of a prominent dentist, whom I treated many years ago. She had sufficient trouble in both nasal fossæ to produce any amount of reflex disturbance, both being filled with polypi. The application of but a small amount of cocain to her nose during the first call had a decidedly bad effect on the action of her heart. I sent her at once to an internist, their family physician, who found that she was suffering from Bright's disease, of which she died in less than a month's time.

There are such a variety of possible causes for vertigo that a thorough examination of the patient should be made before a case is considered due to any intranasal lesion. The following case, however, which recently came to my notice, seems to be one of this sort:

Mr. R., 21 years of age, about a year ago consulted an internist for nausea, headache and eye strain. After washing out and examining the contents of the stomach, he referred him to an ophthalmologist, who failed to give any relief by correction of the refractive error. The case was then referred to me for nasal examination. I found both middle turbinate bones enlarged and pressing upon the septum. I removed both middle turbinate bones, and the patient has remained free from his symptoms since the operation, several months ago.

During the discussion of this subject in 1907, Dr. Frederick Cobb mentioned a series of cases in which a large long middle turbinate bone seemed to be the cause of progressive deafness. I saw in 1908 a lady who complained of deafness, tin-

nitus and otalgia. She was relieved of these symptoms by the removal of a long turbinate bone which contained a large anterior cell. A few such cases have come under my observation.

Among about three hundred cases of large middle turbinate bones which I have treated during the last six years, frontal headache and eye strain have occurred most frequently. The second in frequency were cases of paroxysmal sneezing. (I do not include among these, cases of true hay fever.)

The third in order of frequency are the cases of acute frontal sinus and ethmoid trouble. Many of the middle turbinated bones have more or less hypertrophy of their mucous covering. Many of them contain one or more cells, and when they are large they need not necessarily touch the septum in order to produce reflex disturbance. All of the offending turbinateds seem to be simply a latent state preceding one or the other of the two forms of ethmoiditis, i. e., the suppurative form, or that form accompanied by nasal polypi.

The shape of the turbinate seems to cause the flow of pus from the anterior nasal cells into the antrum. And most cases of antrum trouble not originating from decayed teeth are, in my opinion, the sequel of acute frontal or ethmoid trouble. All or any of the symptoms enumerated should direct our attention to this region, and encourage the early removal of anything preventing drainage and ventilation of the hiatus.

Many of these conditions are associated with deflections of the upper portion of the nasal septum, which may need correction either before or after the removal of the middle turbinated.

The upper part of the septum may be deflected independently of the rest of it. This is a portion which is difficult to correct without going close to the roof of the nose. The advisability of such an operaton will vary with the case and the judgment of the surgeon.

When the deflection is confined to the upper portion of the septum, I prefer to remove the turbinate first, if it can be gotten at. If it is hidden by the septum, then it is necessary to correct the septal deflection first.

Where there is a polypoid thickening of the mucous membrane, it is generally sufficient to remove that without touch-

ing the bone itself. When the bone is very large or broad anteriorly, or when it contains a cell, I remove the whole of the bone with a snare. The wire used in the snare should be stiff enough to grasp the bone and not slide over it. When I fail to remove a sufficient amount of the bone in this manner, I finish the operation with cutting forceps. Should polypi or pus containing cells be found, they should be removed.

Cysts or cells of the middle turbinate, unless their openings are obstructed, or unless they contain pus, do not have any influence upon the symptoms, except through the increase of the volume of the bone in which they are situated.

In making an examination of the nose the whole of the mucous membrane should be thoroughly adrenalized and cocainized, except in the case of acute sinus trouble. The extent of the bone and the relation of the parts are made out much more easily in this manner, and while we are looking for an established sinus trouble we may find some condition the correction of which will prevent the development of sinus disease.

The middle turbinate is usually removed as a part of the examination, where we suspect suppuration of the sphenoidal or posterior ethmoidal cells, in a serious case of eye trouble such as optic neuritis.

The removal of the middle turbinate prevents almost always a return of the acute trouble and prevents the existing attack from becoming chronic, and usually prevents the necessity of performing an external operation.

The diseased middle turbinate interferes with the nasal respiration, and should receive attention before the lower turbinated and as early and as frequently as the septum. It is more in the route of the inspired air than the lower turbinated. It should be removed to relieve pressure reflexes such as eye strain, headaches, paroxysmal sneezing, and especially to ventilate and prevent the obstruction of the flow of secretion from any of the anterior set of cells.

Other symptoms, such as vertigo, cough, twitching of the eye muscles and lacrimal irritation, which are likewise due to the pressure of such turbinals, are always associated with one or the other of the two groups of reflexes, eye strain and headache, or paroxysmal sneezing. One must not, however, attribute all these symptoms to the condition of the nasal mucous membrane alone, for many overfed, obese and lithemic pa-

tients will not yield to any treatment until their habits are corrected. Furthermore, many neurasthenic patients have been uselessly operated upon until the interior of their nose is one continuous cicatricial surface.

We must especially be careful not to consider all the cases sent to us by ophthalmologists as necessarily due to a condition within the nose or its neighboring sinuses, for all the symptoms enumerated are likely to arise from some condition in other parts of the body; vertigo especially has such a variety of causes that the real cause may be easily overlooked.

XXXII.

REPORT OF A CASE OF RHINOPHARYNGEAL FIBROMA.*

By Joseph S. Gibb, M. D.,

Philadelphia.

The report of this case seems to be warranted because of the comparative infrequency of the condition and for the need of accurate records of individual cases.

Fibroma of the nasopharynx fully developed is such a formidable disease and presents so many difficulties in its management that, as pointed out by Norvel Pierce,[1] there is great need of early diagnosis. Perhaps in no other condition in this region are the demands for early diagnosis more urgent. The record of the case here presented will show that the removal of the growth in the early stages is not so serious; while we all know the great difficulties and unparalleled dangers that attend the removal of growths by surgical means when they have formed deep seated attachments and thrown out prolongations into the nasal chambers.

HISTORY OF THE CASE.

I. C., age 13 years. Previous history good. Since the spring of 1909, has had increasing difficulty in breathing through nose. He sleeps with his mouth open and snores. He has occasional attacks of epistaxis. His general health has not been impaired, though his mother thinks he has lost flesh.

The patient was brought by his physician for examination October 27, 1909, who stated that he had made a digital examination of the nasopharynx and detected a mass which seemed to be everywhere attached, and especially so at the vault and to the posterior edge of the septum. The examina-

*Read at Thirty-fourth Annual Congress of the American Laryngological Association, Atlantic City, New Jersey, May 9th, 1912.

tion gave rise to very considerable bleeding. His appearance at this time indicated a marked interference with nasal respiration—an exaggerated adenoid facies.

The rhinoscope revealed a reddish vascular looking mass occupying the entire nasopharynx. There was no evidence of the growth within the nasal chamber. Digital examination detected a hard mass, which seemed everywhere adherent to the surrounding tissues. There was no semblance of a pedicle. The mass seemed to have its origin from the vault, probably from the basilar process of the occipital bone, and there were firm adhesions to the posterior edge of the nasal septum. It gave the impression to the finger of a deep seated, immovable attachment over a broad surface, and that the mucous membrane and all the superficial tissues were stretched over its rounded surface. The examinaiton gave rise to considerable bleeding. With the exception of an unusually large thyroid gland the boy seemed healthy.

Operation November 3, 1909. An anesthetic (ether) was given, a digital examination was again made and further effort made to more clearly outline the growth. The results of the previous examinations were confirmed. The growth was found to be hard and unyielding, and everywhere attached. The point of origin seemed to be at the vault. There was no pedicle. The mass pushed forward the mucous membrane and superficial tissues overlaying its surface. Again there was very considerable bleeding from examination.

It was decided at this time to make an attempt to remove the growth. In consequence of the free bleeding and the consequent embarrassment to respiration this might occasion, it was deemed prudent to do a preliminary tracheotomy. Considerable difficulty attended the operation because of the enlarged thyroid, and it was only after the left lobe and middle section had been dissected free and lifted up out of the way that a point extremely low in the trachea could be found and entered.

The anesthetic, warmed, was now given through the tracheal tube. First an attempt was made to remove the growth by snare. A heavy wire was passed through the nasal chamber, and it was hoped by grasping the growth and pulling it forward that the snare might be made to encircle its base. This was entirely unsuccessful and was abandoned. A strong post-

nasal adenoid forceps was now used to grasp the growth, and while alternate twisting, tearing and traction was made by these forceps, the finger of the other hand was used in an attempt to separate it from its attachments. By these combined efforts we were finally successful in separating it entirely from its attachments and removing it intact.

During these manipulations there was a very considerable hemorrhage, and at the final removal a sudden outpouring of blood, but this ceased very quickly. Aseptic gauze was packed up in the vault, but it was not deemed necessary to replace it, as there was very little oozing upon its removal. On examination of the vault after the removal of the growth a deep cavity was found, at the bottom of which could be detected bare spiculas of bone. While doubtless the removal of this growth could have been accomplished without the preliminary tracheotomy, this latter gave the operator a sense of security which facilitated the operation.

The patient stood the operation well. The tube was allowed to remain for a day. The recovery was without incident. More than two years have passed since the operation. There has been no recurrence and the patient has remained well. The growth was submitted to the Polyclinic laboratory for examination and the following report obtained:

"Microscopic examination of portion of growth shows it to consist of well developed bands of fibrous tissue throughout structure, showing well developed blood vessels and the surface covered with clot and detritus. No evidence of malignancy."

The early diagnosis of nasal fibromata should not be difficult, the symptoms presented being similar to nasal obstructions from adenoids. The differential diagnosis from which may be readily cleared by the mirror and touch. The early recognition of this condition, however, usually rests not so much with the laryngologist as with the family physician or the patient himself.

It may be difficult to impress upon the general practitioner or the patient the importance of such symptoms as nasal obstruction when they see frequent evidences of this in the large number of adenoid cases. However, an effort in the right direction will have been made if it is generally inculcated that nasal obstruction plus epistaxis or the expectoration of blood are symptoms demanding careful attention.

In the study of the literature of nasopharyngeal fibromata one is impressed by the formidable operative measures advocated for their removal. Before the days of laryngology and rhinology these cases fell into the hands of the general surgeon, who rarely saw or at least diagnosed the case until the growth was well developed and encroached on the nasal chambers and the adjoining spaces. It is little wonder that the surgeon with no knowledge of the snare or electrical methods, and realizing the small amount of space offered by the natural passages, should devise some external operation whereby the space through which the growth was to be removed might be increased. These preliminary measures were separation of the external nose, splitting of the palate and other equally formidable operations, and were in themselves severe and subjected the patient to danger from hemorrhage, shock and sepsis.

That the formidable nature of the procedures were fully recognized by the surgeon is evident. Dieffenbach[2] wrote "that great courage is required to undertake this operation, because the surgeon is almost compelled to choose between one of three conditions—choking to death of the patient during the operation, bleeding to death at the time of the operation as a result of tearing or cutting them out, or not finishing the operation."

In more recent years there is a disposition on the part of the surgeon to abandon these preliminary operations and to secure removal through the natural passages. Doyen has done much of this work, and says he has never seen a nasopharyngeal fibroma that could not be removed through the natural passages.

Since the rhinologist has studied these growths his efforts have been directed to their removal through the natural passages. He has brought to his aid both the cold and hot wire snare and the influence of the electric current upon the growth by electrolysis and cauterization. Voltolini and Lincoln[3] have demonstrated that much may be accomplished by electricity, and that the mortality of the disease may be decreased by careful application of these methods. Delavan[4] in a number of able articles has pointed out the advantages of these measures, and deplores the fact that notwithstanding these advantages over the former severe measures there is a singular lack of recourse to them.

Both the general surgeon and rhinologist realize that the greatest danger in the removal of a nasopharyngeal fibroma arises from hemorrhage. It has been observed that hemorrhage is much more severe in an incomplete operation, i. e., where a portion of the growth has been removed, and during the manipulative procedures. If the growth is removed quickly and completely from its attachments, the hemorrhage, while profuse, soon ceases.

To accomplish a quick and complete separation of the growth from its periosteal attachment, Doyen has devised a number of raspatories. It is by rapid operative measures and complete severance of the growth from its origin that this latter surgeon has attained his remarkable success.

Gordon King[5] with this same idea in view devised strong scissors, which were passed through the nasal chambers and an effort made to sever the growth at its attachment. There is no record of King's method having been used in any other than the frightful case which came under his care from Swain.[6] In this case, while King was able to complete the operation, the hemorrhage was appalling.

It would seem from the knowledge we have of the methods used in separating the growth by means of instruments, that some other method were necessary. It was with this idea in view that Voltolini and Lincoln suggested and successfully employed the hot wire snare.

The difficulty in the way of the use of either the cold snare or the snare to be heated by the electric current is the broad attachment of the growth. It is so seldom there is a pedicle. Usually the base is broad and firmly adherent.

Possibly by the use of the forceps designed by Ingals,[7] which grips the growth firmly, and with which powerful traction may be made, the growth may be sufficiently separated from its attachments to enable a wire to be thrown around the base and heated by the current. It would seem, however, that the powerful traction necessary to separate the growth from its attachments would itself induce such bleeding that it were better to complete the avulsion rather than waste time in an effort to pass a wire over the neck secured by the severance of the attachment, and it would also seem not unlikely that the profuse flow of blood would nullify the power of the current to sufficiently heat the wire. But I confess to no

practical knowledge of this method of securing a neck for the wire.

The treatment of fibroma of the nasopharynx depends largely on the size of the growth. At an early stage, but one unfortunately rarely seen by the rhinologist, there are two methods open to the surgeon, depending upon the attachment of the growth. Should there be a well marked pedicle, a condition in my experience very uncommon, it is a simple matter to engage the growth in either a strong cold wire snare or one heated by the electric current and remove it at the base. Should the growth, however, be a sessile one, the base extending over a broad surface, the method of avulsion, while not unattended by danger from hemorrhage, offers a rapid and effectual treatment.

In the hands of a Voltolini and Lincoln it may be possible to adjust the loop of an electric wire over a hard, unyielding and usually superficially smooth mass, but certainly in the hands of the average operator such a course is not feasible. To waste time by the electrolytic method in these small growths would seem unnecessary. At a later stage, when prolongations have been thrown into the nasal chamber, cheek and other contiguous tissue, the management of the case is very different. Each case must be treated on its merits.

Certainly, thanks to the work of Voltolini and Lincoln, and ably championed by Delavan, there must be a decreasing necessity for preliminary operation and an increasing use of the electric. Hence while it may not always be possible to at once remove the growth from its base, a consummation to be desired, such may ultimately be attained by a combination of snaring, electrolysis and cauterization. By one or the other, or all of the measures, room will ultimately be secured in the nose and also nasopharynx sufficient to enable us to encircle the growth with a wire and remove it from its attachment.

The important point in the removal of the growths is to attack them at the base. Growths so removed are much less likely to recur, and the hemorrhage, while profuse at the time, ceases quickly. The treatment must ever be influenced by the age of the patient. We know that the tendency is for growths of this kind to undergo a process of absorption at about the twenty-fifth year of life. Literature contains many cases in which remarkable cures have occurred by what may be called nature's method, where recovery seemed hopeless.

On the other hand, there are any number of cases in literature in which the first appearance of the growth occurred after the twenty-fifth year. Therefore, while we should be mindful of the fact that nature may come to our aid at or about this age, and should be conservative, yet this method of relief should not be depended upon.

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XXXIII.

ATROPHIC RHINITIS AND ITS TREATMENT BY VACCINES.*

By Frederick C. Cobb, M. D., and E. W. Nagel, M. D.,

Boston.

There are few diseases the etiology and treatment of which has been more discussed than ozena. I will not take up your time in consideration of previous theories further than is necessary to show that they cannot harmonize the parts and make a consistent whole.

Let us review, first, the anomalies in shape of the nasal cavities considered as a cause of ozena. Zaufal states that abnormal width of the nasal cavities, due to congenital conditions, causes atrophy of the mucous membrane resulting from stagnation of air and consequent crust formation, while Sauvage and Tillot claim that ozena occurs in narrow noses owing to stagnation due to interference with ventilation. If both authors' observation is correct, then we may draw the conclusion that atrophic rhinitis may occur in either broad or narrow nostrils. As almost every nose, in the opinion of most laryngologists, is open to criticism on one or other of these grounds, atrophic rhinitis would have to be an almost universal disease. Dismissing, then, the congenital anatomic origin as improbable, we have the origin from "catarrh." B. Fränkel explains that the secretion from catarrhal conditions dries and decomposes, causing ozena. But a catarrhal condition independent of such causes as adenoids and tonsils, foreign bodies, sinusitis, pediculi capitis, nasal discharge caused by diphtheria, or other definite local conditions, is, in these days, very uncommon. If, further, in young children a clear case of ozena can be established, the field of nasal catarrh will dwindle to even smaller proportions. Michael and Grünberg considered ozena as an end result of sinusitis, a view which the observations on postmortem cases by

*Read at the meeting of the American Laryngological, Rhinological and Otological Society, May, 1912.

Zuckerkandl negatived, and which has fallen into disuse. As to the diagnosis of atrophic rhinitis, we need not here discuss appearances so familiar to you all. Every laryngologist knows the picture given by the wide nostril with crusts and scabs in the middle turbinate region, sometimes with a large boggy middle turbinate, sometimes with a thin atrophied one. Often odor is present, while, again, in an equally marked case, it is absent. The posterior nares and pharyngeal wall are generally dry and scabby. The larynx, although often unaffected, is sometimes dry and has thickened false cords and interarytenoid folds. I allude to these well known appearances only in order to call your attention from this obvious condition to others in which the results are not so marked. Given a rather wide nostril with some mucus and no odor, is it an atrophic or is it a sinusitis? I can recall cases in the hospital in which a diagnosis of atrophic has been made, where, some weeks later, no width of the nostril could be seen and no crusts or discharge to justify the diagnosis. The only explanation of such errors is the flexibility of the turbinates as regards their size. Wide nostril per se, then, cannot be relied upon for diagnosis. Discharge may be from the sinuses, and only a long process of X-ray can clear up our difficulty, and that, as we know, unless done in the finest manner, is of little value. We are in need, then, of a better and surer method of diagnosis than we possess at present. In 1896, Rudolph Abel, a Privat-Docent in Greifswald, identified in a most admirable article in the *Zeitschrift für Hygiene* a bacillus which he had found in ozena. He describes the bacillus as a thick rod 1.25 mm. wide, and of varying length. The ends are often rounded. Sometimes the bacilli lie together, forming a chain. These bacilli are separated from one another by a capsule. They stain readily with methylene blue and fuchsin solutions, and are decolorized by Gram's method. The number of these bacilli in the nasal secretion varies greatly. They are found in greatest number in the soft secretion underlying the crusts. Abel found many other cocci and fine bacilli associated with the bacillus just described. Probably, in the light of experiments of disinfection of the hairs of the nose, he would have found pure cultures in the same secretion. In over ninety cases we have found pure cultures of the above named bacilli. This bacillus is

called by Abel the "Bacillus mucosus ozenæ." On culture media they form a thick, raised, confluent mass. They grow with great rapidity at body temperature. On lifting these colonies with a needle they seem stringy. In this peculiarity they resemble the mucous secretion under the crusts of the ozena nose. They do not liquefy gelatin. They grow luxuriantly on all the ordinary culture media. Abel warns us that the bacilli cannot be obtained always on the first examination, but after removal of the crusts and scabs for two or three consecutive days he has found them in large numbers, and in subsequent examinations they are always present. He, therefore, considers that they are sometimes concealed in the depths of the folds of mucous membrane. The bacillus is always nonmotile and never produces spores. They do not lie close together, since the capsule does not permit of close intimacy. In fresh cultures these capsules are very marked; after the first or second replant they disappear except in milk cultures. They are not absolutely dependent on oxygen, can grow in anerobic cultures, but not so luxuriantly as in aerobic conditions. It is interesting to note that the bacillus mucosus cannot live in dry surroundings. Cultures which had been kept moist lived and could be reproduced at the end of the year, while dry cultures lived but a month or two. The capsule of the bacillus protects it, according to Abel, from antibactericidal solutions. Injections of cultures of these bacilli in white mice caused shortness of breath, conjunctivitis with plentiful secretion, and the animals died sometimes suddenly and sometimes slowly, without pain. Duration of life after injection was from three to four days. The autopsy on these animals showed a great infiltration at site of puncture, which consisted of enormous masses of bacilli with capsules, fibrin, and pus. The spleen was congested and greatly enlarged. The kidneys and liver were parenchymatously inflamed. The other organs showed no changes. From all the organs enormous masses of ozena bacilli could be obtained. These all corresponded to the same bacillus. It is interesting to note that these bacilli everywhere followed the blood stream, so that the disease could be called a typical septicemia in the bacteriologic sense. White mice are very susceptible to the bacillus ozenæ. Abel found that for various other kinds of mice, rats, guinea pigs, rabbits, doves, and swallows that the

bacillus was not infectious. The bacillus mucosus ozenæ belongs in the same group as the bacillus of Friedlander. The following are the distinctive differences: The growth of the bacillus mucosus appears more fluid and increases so rapidly that it fills the bottom of the tube in twenty-four hours. It does not form in gelatin a characteristic nail-like growth, but spreads over the whole surface. In the old cultures it never colors the media brown. It does not form gas on potato, and in agar and gelatin only in small amounts. Ozena is always fatal to mice, while Friedlander's bacillus is much less so. Finally, Friedlander's bacillus is very apt to make coccilike forms. Usually the rhinoscleroma bacillus can only be distinguished from the ozena bacillus by Gram's method. In doubtful cases clinical appearances will leave no room for mistake. The presence in one hundred cases of well marked ozena of this peculiar kind of bacteria and its absence in all other forms of nasal disease, further strengthens Abel's theory. In the examination of secretion from atrophic noses Fränkel, Thost, Paulsen, Straca, Hajek, etc., have all found bacilli, but have not differentiated them from the pneumobacillus. Are these bacilli found in the mouth or in the healthy nose? Besser, in eighty-one noses (healthy), twice grew Friedlander's bacilli, Wright in ten cases, Delette in fourteen never found them, nor did Paulsen in thirty-seven normal and twenty-four acute catarrhs. Abel, in two hundred and fifty noses with acute and chronic catarrh, with syphilis and tuberculosis of the nose, with pus formation and accessory cavity disease, found none. Netter found Friedlander's bacillus three times in one hundred and sixty-five healthy persons, Rosenthal one in fourteen, Panzini three times in tubercular sputum, Kreuzer once in thirty-eight influenza patients, Kowalsky once in sixteen cases of influenza, Podbiolsky not at all in fifty secretions from the mouth. Biondi injected the sputum of fifty healthy and diseased persons in guinea pigs, rabbits, and mice. The greater majority lived, and in those that died no organ showed pneumobacillus. Abel, who had examined the secretion of the oral cavity in four hundred cases, found in only six cases the kind of bacillus which agrees with that of ozena. In three of these cases no examination was made of the nose, in the other three, one was plainly ozena, and both the other cases showed beginning

atrophy and crusts, and in all three the nasal secretion showed masses of these bacilli. What rôle does ozena bacillus play in ozena? Many authors believe that the bacillus mucosus is simply present in ozena without causing it, but since Abel has found it in all ozena cases and in no others, this hypothesis is not tenable. That it is not the cause of the odor is obvious from the fact that it is found both in fetid and nonfetid cases. The appearance of the mucus found on the under surface of the crusts is almost exactly similar to that seen on agar cultures of the bacillus. It is a harder matter to explain the further progress of the disease. Part of the atrophy Abel believes is pressure atrophy caused by the crusts. The change of epithelium from columnar ciliated to squamous conduces to this condition. Further than this inflammation in the mucous membrane, shown by small round cell infiltration, followed by granulation tissue and then by scar tissue, increases the atrophy. Voltolini believes that atrophy of the bone is caused by the shrinking of the mucous membrane and its consequent contraction of the blood vessels which nourish the turbinates. Observers have not found the ozena bacillus in the tissues, but Abel believes that the poisons generated by the bacteria are taken up by the mucous membrane and are the source of irritation, and he draws a parallel between tubercular tissue with its small number of bacilli in the tissues, and the condition found in ozena. Whether the growth of the ozena bacillus needs for its development an altered nasal discharge or a weakened condition of the blood is not yet determined. Abel experimented on a patient with a culture of ozena. This patient had advanced tuberculosis of the lungs, but his nose showed no signs of disease. In this man's right nostril a small amount of ozena culture which had been carried through several generations was rubbed in without injury to the mucous membrane, while in the left nostril at the same time fresh ozena secretion was also rubbed in. During the four weeks the patient lived, no changes were visible in that nostril, although bacilli were found. In the right nostril, after eight days, typical crusts with mucopus were found under the middle turbinate, and fourteen days afterwards there were numerous small lesions of the same character on the lower turbinate, which did not disappear until the death of the patient. The lesions gave the same picture as is seen in beginning

ozena cases, and from them pure culture of ozena bacillus was obtained. In this individual there were also found, in the right nostril, crusts exactly similar to those found in fresh ozena cases. The mucous membrane showed nothing pathogenic, as was to be expected in this short space of time. In animals inoculations were unsuccessful, as animals do not get ozena. Whether ozena is transferable as an infectious disease, it is difficult to say, on account of the chronic course it takes. Rosenfeld's example, however, is rather striking. He found a family of twenty-one members. Fifteen had ozena, with or without odor. Many authors have observed the same occurrence in families. Abel also examined cases where apparent healing of the ozena process had occurred, and those no longer showed the bacillus. Abel believes that the odor of ozena is caused by bacteria other than the mucosus, and cites the well known fact that when the crusts are removed the smell ceases, although the ozena bacillus at the same time increases. What germ, however, among the numerous ones found in the crusts, causes the odor, Abel cannot say.

In the Transactions of the Congress of American Physicians and Surgeons, Washington, 1910, we have reported a series of cases treated by vaccine made from a bacillus not then identified as Abel's.

In the present series, cultures were taken from ninety cases of atrophic rhinitis, the vestibule being previously sterilized. All showed a pure culture of the atrophic bacillus. Every one of these patients had had previous local treatment without benefit.

Forty patients received vaccine, from four injections up to fifty-six injections. Only twenty came for treatment at the required intervals. No bad effects from the vaccine were noticed. One patient, while objectively better, could herself see no signs of improvement. In all cases, if the patent was using a wash, no change was made during the inoculations, and no local treatment was given. No history of the duration of the disease could be obtained, but in most of the cases it had lasted as long as the patient could remember.

Of the six cases injected two years ago, only two could be found.

A. V., age 24 years, female; fifty-six injections; previous to vaccine large casts in the nose; very bad odor; sensations

of pressure over the bridge of the nose; has used washes for months. Now the nose is practically normal, no odor, no crusts; never washes the nose; has no symptoms.

B. L. R., age 15 years, female; thirty-two injections; large crusts in nose and bad odor; impossible to keep clean. Now the nose is practically normal; no dryness, no odor, no crusts, scabs, or mucus; never uses any wash for nose.

Eight cases where injections had ceased from six months to a year ago.

1. L. G., age 21 years, male; sixteen injections; very large crusts in both nostrils. Deviation to right; bad odor; impossible to keep nose clean with washes; headaches. Now no odor present and no crusts; some mucopus; nose cleared easily. On left side has less mucopus than on right. Unable to continue treatment, as he lives in another city. Returned one year later. Patient said his nose never went back to original condition. Odor has not returned. Very small scabs in both nostrils; much smaller on the left. Turbinate, atrophied. Pharynx, somewhat glazed. As he wished to resume treatment, eight injections were given; when last seen, after discontinuing nasal washing for three days, no scabs or crusts were seen; nose and pharynx absolutely clean. Gain in weight.

2. J. R., age 35 years, male; forty-eight injections. Deviated septum to left; slight in amount. Large casts in nostrils. Pharynx dry and covered with crusts. Patient is hoarse; bad odor. Complains of pressure over the bridge of the nose. Uses about twelve handkerchiefs a day. This was a year ago; now the nose is clean on both sides; no crusts or scabs; inferior turbinate atrophied. Pharynx dry, but clean. Voice is very much clearer. No odor, no pressure over the bridge of the nose; often goes days at a time without using a handkerchief. Several times has had some discharge, but never amounting to a handkerchief a day, and always mucopurulent. Gained twenty pounds in weight during the treatment.

3. Julia R., age 18 years, female; twenty-four injections; complete casts in both nostrils; foul odor; headaches; pressure over the bridge of the nose. Had nose treated locally for four months. Pharynx shows no crusts. Patient seen one year after cessation of injections. Odor has not returned. Has

had no casts or crusts from the nose. Some mucopus on using nasal washes. On examination, left nostril perfectly clean. Right nostril had a small amount of mucopus on middle turbinate. No headaches or feeling of pressure over the bridge of the nose. Her mother has atrophic rhinitis.

4. H. C., age 35 years; female. Complete cast of left nostril; no headaches; no odor. Impossible to keep nose clean by ordinary methods. After eight injections, nose was very nearly clean for three weeks. Patient returned in two months; large crusts had appeared again in the last week. They disappeared after eight more injections. Five months ago she reported that nose was in good condition.

5. S. R., age 20 years; female; fifty injections; large crusts in both nostrils; headaches; foul odor. Examination of the nose one year after treatment ceased, shows it to be practically clean; patient had used a wash, however, thirteen hours before. Absolutely no odor. Patient feels that the treatment is only intermittently successful.

6, 7, and 8 are patients who failed to take their vaccine regularly. They had in all from sixteen to thirty-six injections. In two of these patients the odor disappeared and the crusts became moist. The other had intermittent odor with some improvement in condition of the nose.

Six recent cases:

1. J. S., age 25 years; male; five injections; nose easier to keep clean; no odor; crusts smaller and softer.

2 and 3. M'gt C. and M. C., sisters, ages, respectively, 28 and 18 years. In both cases four injections; less odor; can blow out the crusts easier. Crusts are smaller. The mother has atrophic rhinitis.

4. M. K., age 28 years; female; eight injections. Crusts on both middle turbinates; odor, dryness, and inferior turbinates atrophied. Patient feels that there is great improvement; husband no longer notices odor; slight crusting of left middle turbinate, but crusts are very small and moist; almost like mucopus. Easier to keep the nose free and clean.

5. R. J., age 18 years; male; fourteen injections. Large crusts in both nostrils. Inferior turbinate atrophied. Bad odor. After fourteen injections, subjectively improved; no odor, nose has become more moist. Instead of crusts, only a little pus seen on right middle turbinate. Left side clean.

6. C. R., age 22 years; male; crusts moderate; odor present; atrophy of lower turbinate. After fourteen injections, no odor; crusts smaller; nose feels moist, less handkerchiefs used.

SUMMARY.

Vaccine injections, if carried out regularly, seem to produce permanent improvements. Irregular or small number of injections cannot be counted on with the same certainty, but marked improvement seems to have followed, even in these cases. As to strength of vaccine, each cubic centimeter contains one hundred million bacteria, and the dose varied from one-tenth of a cubic centimeter to one and a half cubic centimeters.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLOGY.

Meeting of December 8, 1911.

Report of a Case of Epithelioma of the Auricle.

EDMUND PRINCE FOWLER, M. D. James D., 60 years old, first noticed a papule on the external skin of his right tragus about two and a half years ago. This slowly increased in size until it involved the whole tragus and concha, the anterior descending horn of the helix, about one-quarter inch of the external auditory meatus, and the upper third of the antihelix.

The neoplasm was diagnosed as epithelioma, and received treatment at the hands of several physicians and surgeons before I saw the case.

For about four months X-rays were applied, but no improvement was apparent. A like result followed the use of radium, electrolysis, and the hypodermatic injection of various substances. The tumor continued to increase in size, and about a year previous to the operation had broken down, the ulceration finally covering a space of about the size of a fifty-cent piece. The anterior and posterior cervical glands were enlarged and tender. These were not removed at operation.

The patient was anesthetized and the growth removed in toto with about one-quarter inch of the healthy integument and tissues surrounding it. This necessitated the ablation of the whole tragus, a portion of the parotid gland, and of the cartilaginous external auditory meatus, the whole anterior superior quadrant of the pinna, and all but a small portion of the inferior extremity of the antihelix. The plastic operation followed immediately and was accomplished as follows: The original apex of the helix was brought forward and downward to cover up the space caused by the removal of the an-

terior superior pinna quadrant. The skin and subcutaneous tissues in front of the wound were brought back to partly cover the raw space in front of and above and below the external auditory canal. This was accomplished by sliding flaps, as shown in the photograph. The wound and external auditory canal were dressed with plain sterile gauze. In three days the sutures were removed and pure powdered scarlet red was dusted over the wound, completely covering it. A sterile dressing was applied over all. This was repeated every two or three days for four weeks, when healing was complete. The cosmetic result obtained is certainly remarkable, and I attribute it largely to the effect of the scarlet red, not only in promoting the extension of the epithelium from the sides of the wound, but by protecting the delicate newly formed skin from injury and removal during dressings. No stenosis of the meatus has resulted, and the appearance of the reconstructed auricle is most satisfactory. The photographs show the appearances before and after operation, and indicate the method of cutting and adjusting the flaps. Since the operation the patient has gained in health and strength, and no enlarged cervical glands can now be detected.

Combined Gauze Packer and Holder.

EDMUND PRINCE FOWLER, M. D. This instrument consists of a hollow cylindric handle from the top of which projects a detachable nozzle, the latter being firmly secured by means of a bayonet clutch. Into the nozzle a Y-pointed plunger is fitted so that its distal or Y-end will just reach the end of the nozzle when the plunger is shoved home. The opposite end of the plunger is supplied with a ring in which the operator's thumb rests during use. This ring is at all times sufficiently distant from the packing material to prevent contact. A shoulder on the plunger limits its inward excursion, and the length of the nozzle and plunger is such that with ordinary care it will not be withdrawn from the nozzle. A detachable spring is fastened inside the handle and so adjusted that ordinary test tubes may be held securely in place. The instrument is made in several sizes, both as to handle and nozzle. It was devised to accomplish the following results:

1. To hold gauze packing and protect it from contamination during use.

2. To supply a means for inserting packing into a small wound or sinus without obstructing the surgeon's view.

3. To prevent contamination of the packing by contact with the entrance or walls of the wound, and the carrying of infectious matter or epithelial scales into the wound.

4. To do away with the pain caused by dressings touching the entrance to the wound, by preventing contact between the two.

5. To furnish a simple, strong, and easily sterilizable instrument which would dispense with the services of a nurse during dressings and save time and trouble.

The gauze packer is operated as follows: Hold the instrument in the left hand, and with the right hand insert a tube of sterile gauze (proper width), pushing it into the handle from the bottom upward, until the rim of the glass tube catches in the notch at the end of the spring. This holds the tube of gauze securely in place.

Take the plunger in the right hand, remove the stopper from the tube, and, picking up the end of the gauze on the prongs of the plunger, insert it with the latter well into the nozzle. Change the instrument into the right hand, grasping the handle with palm and fingers, the fingers being placed beneath the guard. Insert the right thumb into the plunger ring and shove home the plunger until the gauze appears at the end of the nozzle. Insert the nozzle into the wound without touching the sides, and carry the projecting gauze to the desired situation. Alternately abduct and adduct the thumb which is in the ring, thus feeding the gauze from the tube through the nozzle and into the wound until the proper amount has been introduced. Push out a few extra inches of gauze, sever it with the scissors, and detach the gauze remaining in the nozzle by cutting it above the holder after first withdrawing the plunger. Remove the nozzle and put it into the sterilizer with the plunger. Replace the stopper into the test tube and withdraw the latter from the handle. As the nozzle is the only part of the instrument which becomes soiled during use, a series of cases may be dressed by using two or more nozzles and attaching a sterile one to the handle for each case. The handle need be boiled but once for each series of dressings.

An extended test of this gauze packer has demonstrated its usefulness, and not only is it indicated in mastoid dress-

ings but in the introduction of packing or gauze drainage into any cavity, sinus, or wound. It is very effective in packing the nasal cavity. A little practice is needed to enable the user to properly manipulate the plunger in a straight line. If while in use it be withdrawn too far, it will jam, on account of the excessive amount of gauze before it.

This method of packing wounds facilitates drainage and the painless removal of the dressing, as the gauze is automatically twisted into a rounded wick during its introduction into the wound, and is deposited smoothly in layers.

Paper: Report of a Case of Sequestrum of the Semicircular Canals, With Presentation of the Specimen.*

By Edmund Prince Fowler, M. D.,

New York.

DISCUSSION.

Dr. Duel said that he had been especially interested in what Dr. Fowler had said regarding the nystagmus. It was very unusual to see a case with complete destruction of the labyrinth, as in this instance, exhibiting a type of nystagmus the direction of which it was impossible to determine. From all our knowledge, one would expect the quick movement of the nystagmus to be away from the diseased side in a destroying process of this kind.

In regard to the tinnitus which occurred after the destruction of the labyrinth, he had seen a number of such cases. It seemed in his experience to be the rule that a tinnitus occurred on the side of a destroyed labyrinth, perhaps not permanently, but for a considerable period. He attributed this to an irritation of the auditory branch of the eighth nerve.

Dr. Fowler said, in response to an inquiry as to whether the patent had albuminuria or diabetes, that she had both.

Dr. Danziger asked whether any puncture had been made, and Dr. Fowler replied that this was done shortly after the operation.

Dr. Dench said that at the last meeting of the Otological Society there had been quite a spirited discussion on the question of rotation. In the case cited by Dr. Fowler, the

*See page 312.

rotation test was absolutely negative, the healthy labyrinth giving no reaction when the patient was rotated in the direction testing the diseased side. The results of this experiment were very interesting, and should be recorded.

DR. FOWLER, replying to Dr. Duel's remarks about the nystagmus, said that he remembered the case particularly, in regard to the nystagmus, as it was impossible to determine its direction. For that reason it was not thought to be due to the ear disease. It seemed too indefinite to be due to semicircular canal irritation. Several persons who saw the case at this time agreed, and for that reason the tests were neglected. No rotation tests or caloric tests were made. The nystagmus case cleared up two days after the operation, and it was thought to be due perhaps to the general condition. At that time it was not known that the patient had albuminuria or glycosuria. The history of the case was lost or mislaid.

In regard to the tinnitus, it was interesting to observe that it was increased during congestion of the head, brought about by a tight neck band, but after all this seemed logical if there was irritation due to an inflammatory process. It was not a bad tinnitus. Functional tests were not made following the first operation.

Rotation after the second operation showed distinctly that the left labyrinth was functionating, whether rotated to the left or to the right. The time after rotation to the right was 22 seconds; after rotation to the left, 11 seconds. It appeared to be absolutely normal. The caloric reaction in the diseased ear was negative.

Paper: Myalgia, With or Without Otitis.*

BY FRANCIS W. WHITE, M. D.,

NEW YORK.

DISCUSSION.

DR. OPDYKE said that he had had a patient a year ago, a young nurse, who was suffering from intense pain over the mastoid region, and had a temperature of 100.9° to 101.5°. The conditions in the auditory canal were normal, the tympanum likewise. He had advised against opening the mas-

*See page 346

toid, but the symptoms continued—the extreme pain over the mastoid, even over the emissary and over the antrum, extending up over the auricle. After two and a half weeks of that suffering the mastoid was opened and found to be absolutely normal. The bone in the mastoid cells, the cellular structure, was rather eburnated. Nothing else. The patient made an uneventful recovery, and has had no pain since around the ear or on that side of the head.

Dr. McCullagh said that he had operated on a patient some two weeks ago who had been, a month or so previously, in the hospital for two weeks or ten days with an acute suppurative ear. There was at that time but slight mastoid tenderness. The drum had healed and she was discharged from the hospital, but came back in about four weeks complaining of pain back of the ear and tenderness over the tip and antrum. There was a slight thickening of the sternomastoid at its insertion. He did not feel sure that the mastoid was involved, and had an X-ray taken. Dr. Law reported that there was a slight haziness on the affected side. In the course of a week or so, a second X-ray was taken to see if there had been any change. None was apparent. The induration became very much more marked, and the pain very severe. She was told that an exploratory operation should be made, to which she consented on account of the pain. The mastoid was opened, and it was found to be normal except in the large tip cell there was blood stained dark serous fluid. The wound was sewed up and united by first intention. He thought the case was due to myostitis rather than myalgia, on account of the induration over the muscle.

Dr. Dench asked if any culture had been made of this blood stained serum, and Dr. McCullagh answered that none had been made.

Dr. White said that what had interested him greatly was an acute exacerbation of a chronic suppurative middle ear. The patient came in stating that the ear had suddenly started to run more than usual, and at the same time gave a history of a very severe pain in the tip of the mastoid. The question was whether the ear had been running acutely longer than stated, or was it simply an acute exacerbation just at that time, and cold having affected a muscle. It turned out that a muscle was affected and not the mastoid. She was treated for a myalgia also.

Paper: The Operative Treatment of Sinus Thrombosis.*

By George L. Tobey, M. D.,

Boston.

(*By invitation.*)

DISCUSSION.

Dr. Dench said that when a man was called upon to discuss a paper there was usually something to discuss, but that Dr. Tobey had presented such a very complete paper there was nothing to take exception to, and he could only thank the doctor for coming before the society and presenting this excellent article, thus opening up a very extensive and rather new field as regards the operative work in sinus thrombosis. There were one or two points to which he would like to refer: One was the unusual absence of constitutional symptoms in sinus thrombosis. The only constant symptom is the characteristic temperature. These patients feel exceedingly well and, aside from the characteristic temperature changes, as a rule present no constitutional symptoms. The occurrence of optic neuritis in this case is interesting, and is a sign that should always be looked for. Occasionally cases of sinus thrombosis are mistaken for typhoid fever. Dr. Dench spoke of a case which he had seen last year, in which the middle ear inflammation was exceedingly mild in character, and yet was attended by a high temperature, with remissions. Typhoid fever was suspected, but the absence of a positive Widal reaction and the presence of an acute middle ear inflammation made the speaker certain that the case was one of sinus thrombosis. The jugular was excised, and the patient made a complete recovery. Dr. Tobey had spoken of cases where there was a long period of quiescence between the acute middle ear inflammation and the sinus thrombosis. Dr. Dench spoke of a case in which there had been an acute inflammation of the middle ear, with mastoid tenderness. The patient developed a pneumonia early in the course of the acute otitis, which rendered operative interference upon the mastoid impossible. The pulmonary condition cleared up, the middle ear became normal, and all mastoid

*See page 362.

tenderness disappeared. The patient later, however, presented a temperature characteristic of sinus thrombosis, and upon operation a foul, purulent clot was found in the lateral sinus. Complete excision of the internal jugular was performed, but the patient finally died of septicemia.

The speaker was interested in what Dr. Tobey had said about iodoform poisoning, as he himself had observed a case of this kind. The patient was also suffering from glycosuria, and two days after the mastoid operation was semicomatose. The differential diagnosis between diabetic coma and the coma due to iodoform poisoning presented some difficulties. The presence of iodin in the urine, however, made the diagnosis of iodoform poisoning clear, and upon the substitution of plain gauze for iodoform gauze the patient made a complete recovery.

With reference to shock following excision of the jugular, he had not seen this in recent years. If a long time is consumed in taking out the jugular there is apt to be shock, but if the operation is rapidly performed, it is not usually followed by this symptom.

Dr. Dench was also interested in Dr. Tobey's findings regarding the differential blood count, that is, the presence of a high polymorphonuclear percentage, in these cases. His own experience agreed with that of Dr. Tobey, in that he did not consider the differential blood count of so much value in these cases. It should be particularly emphasized that the absence of a high polymorphonuclear percentage did not enable one to exclude sinus thrombosis. When a high polymorphonuclear percentage was present, he was inclined to look for the septic focus either in the brain or in the soft tissues of the neck, rather than in the sinus or in the internal jugular vein. He was inclined to think that the last case Dr. Tobey had spoken of might have gotten well without touching the jugular at all. A number of years ago he had reported a series of cases of sinus thrombosis, which were treated by removal of the clot from the lateral sinus without any surgical interference with the internal jugular vein. Most of these cases recovered. It is not necessary to excise the internal jugular in every case of sinus thrombosis or even to ligate it, as a certain proportion of these cases will recover by simple removal of the thrombus from the sinus. In the case which

the doctor reported, in which there was no clinical evidence of sinus thrombosis, and in which the condition was discovered upon the operating table, he considered the procedure employed by Dr. Tobey perfectly proper.

Dr. Dench said that he would certainly remember this paper for a long time, for he had always been a firm believer in the complete excision of the jugular vein as against simple ligation, and the extensive report which Dr. Tobey had made could not be disregarded.

As to the procedure of tying the vein high up in the neck, above the facial branch, he called attention to the fact that there were practically no tributary veins of any importance given off above this point, so that the procedure suggested by Dr. Tobey would seem to cut off the septic focus in those cases where the clot did not extend to the level of the facial vein. In most of his own cases, however, the lower end of the clot either lay below the facial vein or very close to it. In cases where the clot extended below the facial vein, ligature above the facial branch would naturally be unsatisfactory. In the series of cases reported by Dr. Tobey, however, the uniformly good results spoke for themselves.

Dr. Dench considered the paper exceedingly valuable, and thought that the section was indebted to Dr. Tobey for presenting the subject in such a masterly manner.

Dr. Whiting said that Dr. Tobey could scarcely have chosen a more prolific subject of discussion than sinus thrombosis, its treatment and clinical manifestations. Of course, those who have been watching the manifestations of sinus thrombosis for many years have recognized that we may expect almost any variations from the classical manifestations and still have to deal with the same troublesome disease. Those cases which have all the classical symptoms of sinus thrombosis are easy to recognize. Those cases where the symptoms are often obscure, and the most convincing ones are entirely wanting, are the ones that cause trouble. The doctor had gone over very thoroughly almost every recognized manifestation of sinus thrombosis—malara, erysipelas, etc., were complicating conditions which obscure the real issue, and often in these diseases we think the fluctuating temperature must mean sinus thrombosis, and we have the mortification of knowing that we have operated for a condition that did not exist.

To consider all the questions which the doctor's paper brought up would take too much time, but he would like to speak of two symptoms, one of which the doctor had mentioned briefly. He had said in one case that after opening the inner table there was a discharge of foul smelling pus.

Dr. Whiting said that he had given much consideration as to the proper attention that should be paid to foul smelling pus from the interior of the skull, and was prepared to make the statement that he had never yet seen or encountered a discharge of foul smelling pus from the interior of the skull which was not associated with some kind of cerebral complication. Dr. Whiting said that he had made this statement before, and some men have said that it did not correspond with their experience, but he had given the matter very careful consideration and thought that those who had contradicted it had not observed the question as carefully as himself, but he wished to repeat and emphasize the statement: He has never known a discharge of foul smelling pus from the interior of the skull which did not indicate some complication as meningitis, sinus thrombosis, brain abscess, etc. If he had encountered a gush of foul smelling pus he would have said to a moral certainty that some subdural inflammation existed. Of course we often find large collections of pus when we open circumscribed epidural abscesses, but they are not associated with foul odor. Had Dr. Tobey attributed the same significance to the foul smelling pus that he (Dr. Whiting) does, he would have sought further for a subdural inflammation (the real trouble).

Dr. Whiting said that he wished to emphasize the value of the observation, and he hoped that the other members would notice it and see if it does not have a distinct value.

The next point that he wished to speak of was where Dr. Tobey emphasized the making of a diagnosis of clot in the bulb. That is very difficult to diagnose. Often the skull is opened and the sinus followed from the knee to the bulb. The wall appears healthy, there is no pus, no fibrinous deposit, and it fluctuates on palpation; but he had seen two or three cases of clot in the bulb where the wall of the sinus showed a distinct lessening in tension—having about the same elasticity as a rubber glove finger filled with water; it does not distend the sinus, but the wall is fluctuant to a greater degree than nor-

mal. This constitutes a very important evidence of clot in the bulb. He has found it a marked and easily recognizable symptom.

As to the method of tying the jugular which Dr. Tobey employs—the small incision in the neck, and the simple tying off of the sinus instead of resecting the jugular—his own experience has not been in favor of that procedure, and he was surprised that Dr. Tobey could enumerate a hundred cases where the clot did not extend below the facial vein. He himself had had several cases where it extended even into the innominate vein. Many of them have extended well below the omohyoid muscle. In two of the first three cases he ever saw, the jugular was distinctly palpable along the neck, like a big thickened cord, under the border of the sternocleido muscle, and while that is sometimes made difficult to distinguish from a line of infected glands, yet in these cases it was easy to recognize, and the subsequent operation proved the finding. He had also found that the walls and sheath of the vein after beng removed contained streptococci.

Dr. Duel said that the method of operation which Dr. Tobey had presented in detail emphasized a very important surgical principle, to which he had himself directed attention on a number of occasions in the discussion of this subject—namely, that the cure of a septic sinus thrombosis depends upon one's ability to localize an infection which is becoming the source of a general systemic poisoning. The method by which this is accomplished is not of so much importance, as that it shall be early in the course of the disease, and as complete as possible. Following the example of his teachers and confrères, he had for a number of years—in cases where there was a condition which seemed to indicate the necessity of a localization of a septic focus in the lateral sinus, and possibly jugular vein—adopted the custom of ligating the jugular vein at the lowest possible point, just above the clavicle, and dissecting out the vein to a point as near the jugular bulb as feasible. Four or five years ago, however, it occurred to him that in a large majority of the cases in which he had resected the vein from the clavicle to the region of the bulb, the septic clot had been above this resected portion, i. e., in the bulb or sinus. On careful consideration it had seemed to him that the prolonged operation required in the careful dissection of

the vein, the possible injury of the spinal accessory nerve, causing shoulder drop, and the unsightly scar in the neck, were, in a large majority of such cases, unnecessary. The septic focus was usually located somewhere between the knee of the sinus and the jugular bulb. In a few cases which were seen late, it might be that the thrombus had extended to the vein. It seemed inconsistent when the clot had not extended beyond the bulb to be content with cutting off the circulation in the sinus toward the torcula, half an inch or an inch at most, beyond the septic clot, and then to insist on section of the vein at the other end of the clot, three or four inches below the septic focus. As a matter of fact, it is always impossible in eliminating this septic focus to remove all of that portion of the sinus which lies in direct contact with the thrombus; the portion lying over the meninges, although of necessity infected, is never interfered with. These cases recover. Then why should it be thought necessary to remove the vein from the clavicle to the bulb when there is no clot below the bulb?

Another point in the operation which had been brought to his attention by a geenral surgeon some years ago, was that the removal of the chain of glands along the course of the jugular vein was quite unnecessary, the swollen gland acting as a protection to the patient rather than a menace. The idea that these glands should be removed he believed to be incorrect.

His present plan of procedure was to make an incision in the neck an inch and a half to two inches long, for the purpose of inspecting the jugular in the region of the facial and thyroid veins, and above; if he found that the circulation was not impeded, and that there was no gross evidence of phlebitis or clot, he was content to ligate above the facial and thyroid, thus avoiding interference with the circulation from other portions of the head. He divided the vein and used the portion extending from the bulb as a drainage tube, as Ballance had suggested. He did not close the wound in the neck, preferring to use it as an added measure of drainage. In some instances he had been able to wash through the bulb to the opening in the sigmoid.

Another point in the technic which seemed important was the unnecessary mauling which these cases often received in the effort, on the part of the surgeon, to demonstrate the pres-

ence of a clot in the sinus where the lumen of the vessel had not been entirely occluded. The prolongation of hemorrhage and shock caused by these unnecessary efforts might often prove fatal. In cases where on opening the sinus one was unable to easily demonstrate the clot, it was much wiser to pack off the sinus at the torcular end of the petrosals, and a day or two later it would be comparatively easy to remove the septic focus which could not be found when the hemorrhage was occurring. The important feature was the localization of the infection at the time of operation.

Dr. Seymour Oppenheimer said that he had listened with much interest to Dr. Tobey's paper, which had brought up many points for discussion, though he would only refer to a few. He hoped that in closing the discussion the doctor would mention what had been the mortality in this series of cases treated by this method, simply for purposes of comparison with other methods of dealing with this condition. He would also like to know how Dr. Tobey determines—as he says he can by the ligature method—that he has a patulous vessel, and also how he can determine whether the wall of the vessel is normal from the macroscopic appearance. May not the thrombus extend below the point of the ligature? He also hoped that Dr. Tobey would state how many cases healed by first intention, and in how many the neck wound had to be opened. It has been almost the universal experience that where the upper end of the vein is tied, the ligature comes off after a number of days and a discharge of pus takes place in the neck wound. He failed to see the rationalé of attempting to drain the jugular bulb up hill, which is the thing he attempts to do when he puts a drain in the bulb and ligates and closes up below.

He was glad to hear the doctor express himself so very positively on the bacteremia question. He understood the doctor to say that given a bacteremia he would ligate the vein before proceeding. That was a little further than we have gone in New York, where it has been the practice to expose the sinus first, before ligation of the jugular vein.

Dr. Tobey had spoken of a case of malaria which showed clinical evidences of sinus thrombosis, where it was subsequently determined that the malaria was the cause of the symptoms. This case reminded him of one where he had per-

formed a mastoid operation for another colleague and did not see the patient again for six days, when there was a high temperature, and he was asked to see the case again with some other medical men. The history of the case subsequent to operation was significant of a sinus thrombosis. The presence of plasmodia in the blood and a large spleen made the medical gentlemen decide that it was a case of malaria, and my opinion that it was a sinus thrombosis was overruled and no operation allowed. The patient continued for several days in the same condition, when suddenly a large swelling appeared in the neck and he (Dr. Oppenheimer) was asked to see the case with a general surgeon. The case was immediately operated and the jugular vein was found to have ruptured, which fact saved the life of the patient, as it set up a temporary barrier between the infection and the lung. The wall of the vessel was slit up, leaving the lower end of the thrombus in position as it extended beneath the clavicle, and it was feared the removal of it would allow the aspiration of air. Evidently the lower end was aseptic, for the patient recovered.

Two years ago he had a patient who after operation showed symptoms very suggestive of sinus thrombosis, and subsequently showed a violent cutaneous lesion suggesting erysipelas. The iodoform gauze was taken out of the wound and the symptoms ceased. Subsequently iodoform was again used, and the former symptoms recurred, which seemed to indicate that the iodoform gauze was the cause. Moist dressing was substituted and the symptoms again subsided. When the patient was later coming to the office for treatment, a minute quantity of xeroform was used, and he developed extreme symptoms of cellulitis (which suggested erysipelas), several chills, high temperature, an acute hemorrhagic nephritis, and violent prostration. He was evidently very susceptible to the toxic influence of various drugs employed externally.

This case is of particular interest in demonstrating that the toxic influence of a chemical applied externally can produce a group of symptoms so much akin to a bacterial infection of the venous system.

Dr. Kerrison said that like most of his confrères in New York he had practiced as a rule only jugular resection in cases of infective sinus thrombosis. He thought, however, that it

was an important question whether in certain cases simple ligation might not be the safer operation. As a case in point he cited one which had come under his care at Willard Parker Hospital. The patient was a child suffering from scarlet fever complicated by suppurative mastoiditis of both sides. A double mastoidectomy had been performed. Later symptoms typical of sinus thrombosis developed. The child was exceedingly ill, and the question as to whether it would bear the operation was considered. Operation was decided upon, and the right mastoid selected as the probable site of the sinus lesion. The sinus was opened and then the jugular exposed in the neck. The lower portion of the jugular—i. e., well below the facial branch—had been exposed, when the child showed alarming symptoms of collapse. The vein was therefore simply tied between two ligatures and cut at this point. This child made a perfectly good recovery. It is quite certain that he would not have withstood resection of the vein. This case had suggested to Dr. Kerrison the question whether ligation was not the safer operation in many cases in which the patient's vitality and resistance are very far below par.

Dr. Tobey, in closing the discussion, said that he had reported a mortality of twelve cases out of seventy-three; only four of these, however, could in any way be attributed to the operation. Four died of general septicemia, two of cavernous sinus thrombosis, and one died of scarlet fever, so that out of seventy-three cases only four died subsequent to ligation of the jugular.

As to determining whether the intima of the vein was normal or not—that is absolutely impossible. If the vein is found to be patent, it is tied.

Regarding primary union he could only speak of his own cases. Most of the men leave some small drain, but in fifteen or twenty cases which he has sewed up tight he has opened only two, and one of these was a very marked case of general septicemia when operated upon.

The question of the bulb draining up hill: Of course the vein would drain in the direction of least resistance, and beside, the patient was in bed and not upright.

Replying to the question about bacteremia: He had said that if a case had symptoms of lateral sinus thrombosis and at the same time an acute bacteremia, differential diagnosis

having ruled out any source of infection, he would ligate before opening the mastoid; but he would first have a very careful differential diagnosis and rule out any other septic focus. He had seen a very marked bacteremia from an acute tonsillitis.

Dr. Kerrison had spoken of symptoms in children. It seems practically impossible to make a differential diagnosis of sinus thrombosis in children from septic symptoms alone. No man is warranted in making it without careful consideration of the subjective and objective symptoms in children.

Replying to what had been said about resections, the doctor said he was not opposed to them, but that they had not been necessary in the cases with which he had come in contact.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLOGY.

Meeting of January 12, 1912.

A Case of Unilateral Ablation of Auditory and Vestibular Functions Following Trauma.

DR. FRANCIS W. WHITE: J. W., mounted policeman, aged 28 years. On August 30, 1911, the patient was thrown from his horse, injuring the back of the head to the right of the median line. Although dazed, he arose and caught the horse by the bridle, but immediately became unconscious and in that condition was taken to a hospital, where he remained for sixteen days. Since the accident he has been deaf on the right side.

Examination on November 22nd: Absolute deafness on the right side. By means of a noise apparatus, the left ear was competely excluded, and neither tuning forks nor very loud voices were heard. Ear drum normal. Caloric test: right side, absent; left side, normal. Turning test: right side, 15 seconds; left side, 30 seconds. Finger pointing, normal. No change in direction of falling when position of head was altered, but patient stated that he felt a change of falling direction. (These were made with the turning test.) Station with eyes closed, good. If patient turned suddenly, or suddenly started to walk forward, he experienced a sensation as if he were going to fall to the right. Galvanic test: Right, absent; left, normal.

Eye report: Fundi, negative. Vision equals 20/30 each eye. Muscle balance equal. X-ray report, negative. It might be of interest to note that Grünberg of Rostock reports a case of acute mastoiditis requiring two operations. Three months later the patient fell from a horse. Upon examination a diagnosis of labyrinthitis was made. This was confirmed at postmortem. In the report, both macroscopic and microscopic findings were given. No fracture was found. The writer (Grünberg) states as his opinion that the labyrinthitis caused the fall, and not the reverse.

This, I think, is very important, as no doubt many accidents of a mysterious nature as to the primary cause, if looked into methodically, might be found to be due to a sudden defective labyrinth function.

In the case presented tonight, however, the fall was the primary cause of the deafness. The findings, by means of the various tests, show that both the cochlear and vestibular branches of the auditory nerve are not functionating, and by means of the galvanic test it is shown that the lesion is retrolabyrinthine. The causative element, then, is not large, as both the eye and X-ray reports are negative, and no paralyses exist. We must conclude, therefore, that pressure in the course of the eighth nerve, or in the region of Deiter's nucleus, is present. Sudden loss of labyrinthine function may occur in acute suppurative ear disease or in acute exacerbations of a chronic suppurative ear disease. In this case no such condition was present. There was no discharge from the ear, the drum membrane was intact, and no scars were present. Drugs, tumor, fracture and acute exudations in chronic middle ear disease, and typhoid conditions can all be ruled out.

Hemorrhage—as in leukemia, arteriosclerosis, lues, and trauma: The first two can be excluded on general symptoms and signs, although it must not be forgotten that youth does not rule against arteriosclerosis, nor does the absence of external signs disprove the presence of sclerosis of the internal vessels, the socalled internal form.

The patient denied specific infection, but failed to report at the laboratory to allow a Wassermann reaction to be made. The cause, then, no doubt, is trauma—as the history shows—and hemorrhage as the result of it. As in any other condition there should be a tendency to remain stationary or grow worse, whereas the patient's symptoms have improved until now he complains only of deafness and slight buzzing.

DISCUSSION.

Dr. Kerrison asked if the deafness was complete, to which Dr. White replied that the patient was absolutely deaf in the right ear by both fork and voice test. Dr. Kerrison cited from his own experience a case recently referred to him by Dr. E. Valentine Hubbard. The patient, a policeman, on

night duty, had been knocked down and severely injured about the head. He had been taken away unconscious in an ambulance. Previous to the accident his hearing was not impaired. Since the accident, however, he had been deaf in the left ear. By careful tests the deafness proved to be complete. Dr. Kerrison said it would be interesting to have the opinion of the section as to whether the lesion were due to simple labyrinthitis due to simple concussion resulting from the accident or to fracture. He recalled the experiments made some years ago by Mr. Cheattle of London, who produced experimentally fractures on a large number of skulls, and found it impossible to produce a fracture which would involve the labyrinth. Mr. Cheattle accordingly concluded that fractures of the skull rarely, if ever, passed through the petrous bone and labyrinth. There had, however, been several cases since then in which fractures of the skull had been proved by autopsy to have included the labyrinth.

Dr. Hurd told of a young woman he had seen three years ago, who a year before had been thrown from an automobile and was unconscious for a short time and afterward showed dullness of hearing, pulsating tinnitus, vertigo, and intense headaches for six months. The tinnitus and headaches continued to the end of one year with vertigo at times. There is a pinkish yellow line running across the promontory downward and backward. She came to him for a condition of slight vertigo and tinnitus. Upon testing with the tuning forks the C_2 was greatly diminished, more through the bone than by air conduction, but all the rest of the tones were perfectly normal, only the center tone was injured.

About the same time he had another patient, a carpenter, who had fallen from a scaffolding. When first seen both drum membranes were bulging with blood. A month later he had absolutely no hearing, some tinnitus, and if he had had any vertigo it had all disappeared. Evidently he had had a fracture of the base running through both labyrinths, with extravasation of blood. He had advised against operation, and the man got well, but with total deafness.

Some years ago he saw another case, in which the patient, a woman, had been hit on the head with an axe. He could not discover any fracture, but cerebrospinal fluid flowed from the ear for weeks afterward. So it would seem possible that

a fracture of the base can involve the petrous portion of the temporal bone.

DR. WHITE said that he had read reports of a couple of cases of complete deafness following trauma. One was by Delie. That patient had been struck on the occiput with a walking stick. There was loss of consciousness, followed by loss of speech and hearing, with normal intelligence. These symptoms disappeared later. Politzer reported the other. The patient suffered from complete deafness following trauma. Eleven months after, there was a sudden return of hearing.

Case of Temporosphenoidal Abscess—Operation—Recovery.

DR. WILLIAM LEDLIE CULBERT said that he showed the patient through the courtesy of Dr. McKernon. The patient came to the Manhattan Eye, Ear and Throat Hospital August 1, 1910. He is an Hungarian, and at that time spoke very little English, so that the history he gave was very scanty, and may be taken with some question. He speaks very much better now. He stated that he did not remember ever having been sick until two months previously, when he had an attack of rheumatism, which continued up to the time of his coming to the hospital. He had pains all over the body, so that he became more and more incapacitated, and finally was unable to do his work. At the time it was said that he had taken so much medicine for his rheumatism that it affected his ears and made him deaf, with roaring in the ears and fullness in the head, for some weeks. For five days before coming to the hospital he had had a decided earache in the right ear, following a severe cold, which increased the tinnitus, and he claimed that the deafness was total. Dr. Culbert said that he himself did not see the patient until the 7th of August, at which time he had a very profuse discharge from the ear, which continued right along. On August 5th he had complained of localized pain and tenderness over the temporal region. On August 7th a simple mastoid operation was performed, and the zygomatic cells were found to be extensively involved, and a curette seemed to slip readily into the hole, which was rather surprising. Investigation revealed a track up there, and pus and brain tissue seemed to be coming out. There was quite a cavity, so a longitudinal incision was made, the squamous portion of the temporal removed, and an area

of dura was found to be exposed. Evidently the condition had been existing for a long time. Recovery was uneventful and complete, and he has been able to do his work ever since, now a year and a half ago. He now hears perfectly well in both ears.

DISCUSSION.

Dr. Page asked if he understood correctly that it was an acute mastoid condition of rather short duration.

Dr. Culbert replied that the mastoid history was not very clear, but from what the man said, it was only five days previously; he had had pain in his head for nine weeks; he said the pain was all over him.

Dr. Page said that it was very unusual for a temporosphenoidal abscess to develop after so short a time. He recalled a case that followed an acute mastoiditis of short duration (but this case was probably due to an unrecognized injury at the time of the mastoid operation). The duration was about three weeks, and the case was subsequently reoperated upon. An opening in the dura was found, through which pus escaped. This was enlarged and drained, and the patient did well for several days. Because of a slight recurrence of symptoms, however, it was thought necessary to further explore and probe the cavity. The result was he died within a very few days.

Dr. Kerrison asked if Dr. Culbert had employed any drainage.

Dr. Culbert replied that he used a small cigarette drain and put it in an inch and a half, pulling it out and cutting off a little each day. Evidently it had been running before, but had not been diagnosed. It was evidently an old perforation and had penetrated to the dura. He had been very careful at the time, recognizing that it was an old walled-off condition. He did not enlarge the opening into the dura, but simply touched it with carbolic acid and put in the drain.

Dr. Myles said that Dr. Culbert's success was chiefly due to his caution in not breaking down the phagocytic wall. Many years ago he himself had reported a somewhat similar case in the transactions of the American Otological Society. While operating on the mastoid of a child, when curetting in the region of the attic, the instrument suddenly passed with-

out resistance quite a distance into the brain, and pus gushed out. He had considerable respect for the brain at that time, so simply scraped away some necrotic débris from the margin of the tegmen perforation. He kept the wound wide open, however, and the child gradually recovered; it was insensible at the time. At the end of a year the child was in very good condition. He attributed the recovery to the free drainage and the noninterference with the wall of the abscess cavity.

DR. HURD asked if there was any odor to the pus.

DR. CULBERT replied that there was odor for two or three days.

DR. KERRISON said that there were some interesting points in the case reported by Dr. Culbert, which was apparently that of a brain abscess drained through a fistulous tract. Experience had proved that such cases were those which offered the most favorable prognosis. It was probably a consideration of this fact which led Profesor Heine of Munich to the statement that a brain abscess drained through a fistulous opening in the dura does not require any further puncture by the surgeon, drainage having already been provided for.

Enchondroma of the Auricle.

DR. L. M. HUBBY. The patient was a boy, seventeen years of age. There was no family history of syphilis or growths of any kind. His mother died of pulmonary tuberculosis at thirty-seven. He had measles, whooping cough and scarlatina, the last at four years of age. Ever since the scarlatina both ears have run.

A radical mastoid operation was performed on the right side during an attack of acute mastoiditis at six years of age. This was foilowed by a partial and temporary facial paralysis.

At twelve years of age a radical mastoid operation was done on the left side. A severe perichondritis ensued, which gradually disappeared, leaving some thickening, especially in the concha. Nine months later a swelling started on the helix. In two years it had reached nearly the size of the entire pinna, when it was removed. In one year it began to recur.

Now, after two years, it is about three-quarters the size of the pinna (four by two by one and a half centimeters), kidney shaped and bent forward so that it entirely occludes the external auricular canal. It has a cartilaginous consist-

ency, and the skin over it is closely adherent. The blood vessels coursing through this skin are numerous and dilated. There is no fistula or purulent inflammation in proximity to the growth. There is a moderate purulent discharge from both ears, coming from slight granulations near the eustachian orifices. Four days ago the left eustachian orifice was curetted thoroughly. When this discharge stops it is planned to remove the growth.

DISCUSSION.

DR. MYLES asked if any of those present had opened up a case of perichondritis of the auricle, removed the diseased perichondrium, packed it, kept it open, and let it heal. He had so treated some cases of that kind in the nasal septum with a good deal of success, and did not understand why it should not be equally satisfactory in perichondritis of the ear. He had not, however, seen any reports of such treatment of these cases.

DR. KERRISON said that the treatment mentioned by Dr. Myles was rather frequently used by aurists. In some cases through and through drainage, i. e., through cartilage and both skin surfaces, was effective. In others, necrosis of the cartilage required more radical measures, viz., excision of the necrotic area. Usually in such cases there was some deformity, but often less than would be expected from the apparent severity of the lesion.

Paper: A Case of Acute Mastoiditis, Sinus Thrombosis, Superficial Brain Abscess—Recovery.*

BY FRANK TUCKER HOPKINS, M. D.,

NEW YORK.

DISCUSSION.

DR. PERKINS said that it was a question when one could call a complication of this kind a brain abscess. If you incise the dura and find an escape of brain tissue, is it a brain abscess? That was the question brought up by Dr. Hopkins.

Some time since, in looking over some reports of cases of brain abscess, he had noticed several which were reported as

*See page 351.

such, in which he had been unable to make out that the pus had ever existed inside of the brain itself—that is, it was on the surface of the brain, perhaps a circumscribed meningitis with ulceration of the brain, so that when the dura was incised, brain tissue with pus was evacuated, and the case was put down as a brain abscess. He would like to hear some expression of opinion on the question raised by Dr. Hopkins in this paper.

Dr. Kerrison said he did not recall ever having heard of a case of direct infection of the subdural space or brain from an infective sigmoid sinus thrombosis. Such a pathway of infection, one would think, would lead to a typical subdural abscess.

Dr. Hopkins, referring to the question as to whether the pus originated on the surface of the brain or came up through it, said that the brain surface was distended so that it lay on the outer wall of the sinus. The incision was carefully made, and could not have touched the brain itself, unless it was resting on the outer wall of the sinus. Of course the fluid in the sinus might have been very slight, and the sinus might have sagged to the surface of the brain, but it did not appear to be so when the examination was made. It was not distended, as the sinus naturally is, but it was not sunken in—only somewhat flat. If it had been resting on the brain surface with no fluid in the brain itself, where did the fluid come from? For there was an issue of a considerable amount of fluid, which must have come from the sinus, or the brain. As it seemed to him at the time, the fluid was under the surface of the brain and had pressed it against the outer wall of the sinus.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLOGY.

Meeting of February 9, 1912.

Paper: Gunshot Wound of the Ear.*

By John B. Rae, M. D.,

New York.

DISCUSSION.

Dr. Fridenberg said that one of the favorite points chosen by the attempted suicide was back of the ear, generally on the right side. This is sometimes of medicolegal interest, for these people frequently keep their lives and lose their sight. It is evident that the attempt to fire the revolver into the ear is not sufficient.

Dr. Rae, replying to Dr. Fridenberg, said that the boy denied that he had attempted suicide, and claimed that it was purely an accident. Dr. Rae said that he recalled hearing of a similar case, in which the patient was shot with a 22 caliber gun, in which both optic nerves were cut. The man recovered from the wound, but was totally blind.

Paper: Case of Acute Mastoiditis in a Child, Followed by Acute Meningitis and Labyrinthitis.†

By Harold Hays, M. D.,

New York.

DISCUSSION.

Dr. Bryant said that he had seen this very interesting case and had been very much impressed by the absence of any reflex symptoms of meningitis. There were none whatever. The case is one of those which make one doubt the value of the various reflex tests for the diagnosis of meningitis, upon

*See page 359. †See page 377.

which so much stress has been laid. It shows that a meningitis may be fatal without any of the conventional signs present. When seen, the wound appeared to be perfectly healthy. There was no sign of suppuration or any necrotic area.

Dr. Kerrison said that Dr. Hays' case suggested an interesting question not covered in his report, namely, the probable pathway of infection to the meninges. As the report was given, labyrinthine symptoms were noted only late in the disease, but since the labyrinth is a very common path of infection to the meninges, one wondered whether early symptoms of vestibular irritation had not been overlooked.

Dr. Danziger asked if a section of the brain had been made to see if possibly there was a cerebellar abscess. That question should be eliminated before one could decide whether the child had a meningitis first and a labyrinthitis afterward. In case of a cerebellar abscess there may be some symptoms of meningitis first, and then a nystagmus of the same type.

Dr. Heller said that the blood count was very important with children. It is generally considered that when there is a high leucocyte and polymorphonuclear count that the patient is very ill, but a child with a high blood count has a better chance of getting well, for it shows that the body is throwing out its army of defense. Similarly, a child with an abnormal temperature has a better chance than one with a subnormal, showing greater resistance.

Dr. Rae asked if any attempt was made to try the caloric tests, etc.

Dr. Alfred Kahn said a very important point in the diagnosis between sinus thrombosis and pure septic meningitis is that in the latter case the fever will often rise high in a short period after operation, even as short a period as twelve hours; whereas in sinus thrombosis the length of time after the operation in which the temperature goes up is somewhat greater. He referred to a case he had recently. Another point is that in pure septic meningitis the temperature does not drop and then run up very high, as in sinus thrombosis. The intervals between rise and fall are shorter in meningitis. It seemed to him important as to whether a blood culture had been made: if blood culture had been made early after operation and showed streptococcus capsulatus, that would indicate circulatory infection through the venous system, possibly

through the sinus; whereas in meningitis the streptococcus would probably not be found in the blood so early. In a case of labyrinth disease the probability is that the cochlea also would be involved, and that there would be deafness on that side.

Dr. Hays said that it must be remembered that the child was only eight months old, and that no caloric or hearing test could be applied, especially as it was almost stuporous at the time of operation. He concluded that it was labyrinthitis, for the child showed a nystagmus which seemed characteristic. The sinus was exposed at the time of operation, and it was reasonable to suppose that there was some infection through the labyrinth. As Dr. Kerrison had said, it was possible through that route. Although no autopsy was allowed, a portion of the petrous bone was removed, and there was no sign of infection through the dura, or any suggestion of meningitis.

He had tried to emphasize two or three points. It is unusual to have a child come in with a temperature of 101° or 102°, with no signs of ear trouble excepting a slight redness behind the mastoid; and on incision behind the mastoid, to find the bone apparently normal, and then going deeper, to find destruction of the bone. If we could not ascertain whether the drum was bulging, one would hesitate to do a mastoid, and yet we see how important it is to go into the mastoid as soon as we find any suggestions therefor—even symptoms that may not point clearly. A lesion like this makes us inclined to be radical.

Dr. Bryant's points about not having any meningeal symptoms were very interestng. This child had no reflex symptoms, absolutely nothing to point to meningitis; it was simply a routine procedure, to do a lumbar puncture, and the fluid was found. What was found was a very unusual condition, and the case should teach us to be very chary about making a prognosis on blood counts. A blood culture was impossible in a child of this age. After the petrous portion was removed the sinus was inspected and found not to be involved.

Case of Primary Jugular Thrombosis in a Child.*

By I. M. Heller, M. D.,

New York.

DISCUSSION.

Dr. Danziger said that he did not understand why Dr. Heller claimed this as a case of primary thrombosis, as he had shown that there was bleeding from above and below, which does not exclude a thrombosis, as there remains the possibility of parietal thrombosis. Second, it shows a very interesting point. The doctor found that after the operation the child lost its hearing completely, and at the same time gave symptoms of vestibular irritation before the operation; though he did not even do a radical operation, but simply removed the diseased tissue, the child got over the labyrinthitis very well, whereas all know that in cases of diffuse labyrinthitis the percentage of deafness after operation is very large. That shows that we should not go into every acutely inflamed labyrinth. It would be interesting to know how much hearing this child had before operation, and also to know whether it was an acute condition in the labyrinth or a slowly progressive atrophy, as we find it in chronic cases.

Dr. Heller, in response to an inquiry from Dr. Hays as to whether a blood culture was positive, replied that the culture was negative, and the pus also did not show any cocci, except in one instance, when a few streptococci were found.

Dr. Bryant said that in most instances the jugular bulb is very near the middle ear—either at its inferior posterior or inner walls, and the venous connection between the jugular bulb and the mucosa of the middle ear is made very close indeed by the venæ breves. It would be very easy to imagine a thrombosis starting in the veins of the mucous membrane and extending through into the jugular bulb, thus forming a thrombosis of the bulb. This thrombotic extension probably occurs oftener than we realize. The question as to why a primary thrombosis of the jugular bulb is not more common, is a question of drainage. The cavum tympani is more readily drained than the mastoid antrum or cells. For this reason

*See page 380.

the thrombotic extensions more frequently occur from the antrum and mastoid cells into the descending part of the sigmoid sinus than they do from the mucous lining of the cavum into the jugular bulb.

Dr. Hays said that it would seem from the history of the case that it could hardly be called a case of jugular thrombosis. One would think that there might possibly have been a thrombosis along the wall, or possibly no thrombosis at all. If elimination of bacteria had stopped after the ligation of the vein, it would seem that Dr. Danziger had been pretty nearly right in what he said. Dr. Heller could not be blamed for not acting upon these symptoms. It would seem probable that there was some deep-seated process in the bone, which had nothing at all to do with the vein.

Dr. Kerrison, speaking of the anatomic relations of the jugular bulb to the tympanic floor, said that one got a very clear idea of these relations if one would examine them in the skulls of infants of different ages. Perhaps some of the varying views expressed as to these relations may be explained by observations made at different ages. In an infant of one year or under, the floor of the tympanum occupies a very nearly vertical position. The plane of the annulus tympanicus, and therefore of the membrana tensa, is so nearly horizontal that these structures form really an inferior rather than an outer wall of the tympanum. The floor of the tympanum is very thin at this age, and the jugular bulb is practically always internal to it.

A question suggested by Dr. Heller's report is whether his case was really one of primary jugular thrombosis. One sees many cases presenting characteristic symptoms of sinus infection in which on opening the sinus no physical evidences of a clot or septic lesion are found, and in which free bleeding is obtained both from the torcular and jugular ends. Should a septic parietal clot in such a case be found to exist in the bulb, one cannot from this conclude that the lesion is primarily in the bulb. Dr. Kerrison said that he had operated on several such cases in the Willard Parker Hospital, but never upon one in which he was able to conclude that the infection originated in the bulb.

Dr. Heller said that there were many difficulties in getting the history of the case, as he could not speak Russian and the

father could speak no English. The parents, moreover, were very much upset by the fact that the child was almost deaf on one side, and they were very anxious, and the history was very much confused. The point about the dizziness was not brought out until the child was almost healed, so that he did not feel that he should be blamed for not giving that part of the history due consideration.

As had been said, parietal thrombosis was one of the possibilities, but Dr. Danziger's criticisms in regard to the jugular thrombosis, on the ground that hemorrhage occurred after the jugular was tied, do not hold good. If we consider that the inferior petrosal sinus helps to form the bulb with the lateral sinus, and if we picture a clot just at or beyond that part, it is easy to see how a return flow could come after the jugular was ligated. That had been further impressed upon him by the fact that after the operation there was no bleeding from that end. At the beginning, he had been very much in doubt as to the diagnosis, and finally concluded that there was a jugular condition; it seemed more reasonable to suppose that it came from the jugular bulb than from the long, tortuous course of the labyrinth, although they might have coexisted, of course.

The child had some hearing before the operation, for she had been attending school, although that might not mean much. The point that had impressed him most was that the jugular did not lie on the floor of the tympanum, as Dr. Kerrison had said. He had always believed that the floor of the tympanum was the roof of the jugular fossa. This specimen showed that the bulb was above the level of the floor of the tympanum, so it was easy to see that if there is an infection in the tympanum which extends in that direction—posteriorly rather than internally or downward—we could get a jugular thrombosis, although in this case there was very little bone between the antrum and the lateral sinus.

Paper: The Role of the Labyrinth in Ideas of Tone, Rhythm, Time and Space.*

By Percy Fridenberg, M. D.,

New York.

DISCUSSION.

Dr. Bryant said that he felt he must take exception to Dr. Fridenberg's statement that every fiber of the cochlear nerve transmits but one tone. That view rests merely on dogma; there does not appear to be any other authority for it. He had brought a few notes on the subject of the paper, which with permission he would read.

Elie von Cyon began his work on this subject in 1872, and continued it to 1900, devoting much time to working out a somewhat transcendental philosophy which has received less attention than it deserves. In 1908 von Cyon shows in a monograph why the senses of time, space and geometry are located in the semicircular canals, and the mathematic sense in the cochlea.

Alexander (Vienna), 1909, discusses von Cyon's views and discredits his premises and conclusions, and declares they are not proven.

Röthie in the same years says that von Cyon's experiments show that the semicircular canals and vestibular apparatus are not the only organs of equilibrium. Röthie agrees with him that the semicircular canals are the organs of direction.

In 1909, Stefanini agrees with von Cyon that the semicircular canals are the organs of geometric sense and also the organs of the sense of time, the organ of the sense of number and the arithmetic sense lies in the cochlea.

In 1911, Doniselli (C.) writes on the cochlea, the organ of the arithmetic sense.

Passow, speaking in 1911, says that the ear labyrinth has been described as the seat of two sense organs, a geometric organ by virtue of the three direction-sensations of the semicircular canal, and an arithmetic organ by virtue of the tone-sensations, so that with the assistance of these two organs we are supposed to arrive at the conception of space in the three directions and at the formation of the idea of time and num-

*See page 386.

ber, but these views can hardly be considered as anything beyond ingenious theories.

Dr. Bryant thinks that von Cyon's work is very important and deserving of very much more attention than it has received, that all otologists know the fundamental importance of the auditory organ, but no one has given as clear a definition of this importance as von Cyon. He thinks that von Cyon does not sufficiently emphasize the important function of the vestibular sense organs, the maculæ, in sensing movements, especially those in straight lines. Dr. Bryant thinks the vestibule is the special sense organ for linear distance, and that this sense furnishes the theorem that a straight line is the shortest distance between two points.

Dr. Danziger asked if he had had any experience in regard to the development of the arithmetic sense in congenitally deaf children.

Dr. Glogau said that he had had opportunity to examine a great many atypical children in Dr. Grossmann's school for atypical children at Plainfield, New Jersey. Dr. Grossmann is the man who first studied the atypical child; in his school there are backward and exceptionally bright children. By careful examination of their vestibular apparatus with cold and warm water and rotatory tests, and then by applying to their acoustic apparatus the tuning forks, he has found that the precocious children have an increased irritability of both the acoustic and vestibular apparatus. It is easily understood that the socalled musical prodigy hears especially well on account of its congenitally overacute audition, and has a musical sense developed in the early stages of its life. These children are mentally advanced.

The backward children, on the other hand, react very sluggishly to sound and to all tests for nystagmus. That the musical influence has much to do with the mental development of the child was found by one fact in this school. When a backward child came in and had to walk with the other children while the teacher was playing the piano, at first he would walk very slowly and unrhythmically, but after having been for a year and a half in the school he would walk very much better, nearly as rhythmically as the other children. All these facts show that the semicircular canals and the acoustic apparatus have much to do with the ideas of time and space,

and with the mental development of the children. Whether congenital or acquired, any marked pathologic changes in the semicircular canals will bring the child physically and in consequence mentally nearer to those predecessors of men in the chain of animal development whose static apparatus was either defective or missing.

Dr. Glogau said that he had not referred especially to children in the public schools, but that there are atypical children that are backward, and when they have been drilled under music their step is a little better. That only shows that the musical sense is under control of the semicircular canals. Their musical understanding, however, has nothing to do with their mental development.

Dr. Strouse spoke of the deafmutes who do not hear the music at all, but simply see the movements of the leader in front. When they first enter the school they are very sluggish, but after a time they march very accurately, showing that rhythm and time are not dependent upon the ear alone.

Dr. Kerrison said that Dr. Fridenberg's paper was exceedingly interesting to him. If, in accordance with von Cyon's theories, the cochlea is to be regarded as an organ having to do with ideas of tone and rhythm, and the semicircular canal system as having to do with ideas of geometric proportion, it would be interesting to note any average deficiencies in these faculties in congenital deafmutes, and perhaps also in certain isolated cases in which the function of both labyrinths was obliterated as a result of disease. It was a most fascinating subject and one which should provide a field for many very interesting observations and experiments.

Dr. Hays said that it would seem we have eliminated entirely the question of instinctive perceptions Since man was created we have had semicircular canals, and the child is born with an instinctive perception of time and space, which is developed in early infancy. There are certain persons in this world who not only think through a fourth dimension, but throw themselves into it.

Dr. Alfred Kahn spoke of instinct in the development of the sense of time and space. He referred to vegetable life, and said that certain plants will bloom and then droop and fall after a measured time. So there may be a sense, not in the brain, as to time and space, a pure case of evolution, which

becomes instinctive in animals. He further said that in Vienna experiments had been made on pigeons. The labyrinths in these birds were variously destroyed on the right or left side, or on both sides. The birds would fly in various directions, or lose their power of equilibrium altogether, according to the labyrinth destroyed. Somewhat similar experiments have been made with monkeys, where various sections of the brain had been removed. The animals would take directions either to right or left, according to the section removed.

Dr. Danziger said that the result in certain cases where the labyrinth was removed would not give the correct idea, for the brain has gotten some impressions through the labyrinth. We can only consider cases where there has never been any function—that is, in congenitally deaf children. He would like to know if Dr. Fridenberg had had any experience with such cases.

Dr. Fridenberg, in closing, thanked the gentlemen for their interest in his remarks and for the interesting discussion of a rather abstract and transcendental subject. The section was to have had a paper on the "Physiology of the Labyrinth," from Dr. Shambaugh, which would undoubtedly have offered interesting results of original scientific work. Sudden illness had prevented Dr. Shambaugh from coming to New York, and it was with the more regret that the reader of the evening's paper took his place at short notice, in that he himself had to offer only a general talk in which there was much that was fanciful, little that was practically applicable, and nothing original. Dr. Eagleton had referred to his distaste for mathematics, an aversion shared and fully appreciated by the reader of the paper. Perhaps both he and Dr. Eagleton were of the type who think with visual concepts and not with ideas of form and number derived from aural impressions. There was further consolation in the well known fact that mathematic prodigies, lightning calculators, and others of that class were frequently lacking in intellect for all other processes, in fact, they were distinctly below par and of low mentality. The relation of musical to mathematic capacity and instinct was well indicated in the precocious and unusual development of just these two faculties, especially in children, and by their being rudimentary in common, again, in back-

ward children. As to the mathematic ideas of deafmutes, the reader had little personal knowledge, and called attention to the fact that we conclude much too much from generalization. We know very, very little about the detailed mental processes of normal children at different ages, especially as to the formation of ideas of number, form, time, space, and so on. The ideas of time and tone are certainly related. As to Dr. Bryant's objection to the Helmholtz piano string theory of individual representation of tones of different height by a single fiber, the reader was well aware that serious objections had been raised to the acceptance of this theory in its original form, but there was no other which explained the phenomena as well, and no doubt that the organ of Corti was much better fitted than the retina to gain sharply differentiated impressions from slightly varying vibrations. This with the field, unlimited in extent and direction, of audition, made the ear far superior to the eye, with a range of six or seven octaves as against less than one for the eye, as an organ for the originating of impressions of number and time. As to ideas of space, the reader thought it very inadvisable to attempt to explain all space concepts as due to labyrinthine impressions. There is no doubt that all sense organs participate in the development of our ideas of position, space, and balance, and possibly, also, of number and rhythm; thus touch, sight, sense of motion derived from joints, muscles and viscera, and cochlear and semicircular canal sensations, all are factors. It is very fortunate for the human organism that we have this multitude of functions; this forms a factor of safety for the human mechanism. It did seem probable that all our sense perceptions were referred to the standard of the labyrinth, so that impressions originally coming from touch or sight were adjusted, measured, and compared to scale of the three dimensions of the semicircular canals. This would explain why our space has three dimensions and why we cannot even conceive of a space of four or more dimensions, as suggested by the neogeometricians. It is certainly probable that our ideas of time, space, and number, as well as our finer coordination of muscle action depending on these functions, as in speech, are under control and regulation by the labyrinth, and our judgment is largely based on comparison of these data with aural concepts.

NEW YORK OTOLOGICAL SOCIETY.

Meeting of January 23, 1912.

Salvarsan in Ear Disease.

Dr. Arthur B. Duel presented a patient from his service at the Polyclinic; a well nourished young man, 27 years of age, of Greek parentage. He had suffered since early childhood from a double chronic purulent otitis. The otorrhea had been intermittent up to about two years ago, when it ceased, first in the right and later in the left. The hearing has been seriously impaired in the left ear for several years, but in the right was very good until the middle of last November. About the middle of May, 1911, he contracted syphilis, the initial lesion being a preputial chancre. No secondary eruption appeared. Diagnosis was made from appearance of chancre and bilateral buboes, confirmed by positive Wassermann test

On the 19th of July the first injection of salvarsan, 6 decigrams, was given, intravenously, by Dr. Sinclair. No symptoms appeared after the injection until August 20th, when dull headache began and increased in severity for a month. During the middle of this period his sight began to fail, and for the month following, his eyesight was impaired most of the time. One evening in the latter part of the month, he was barely able to find his way home; his vision diminished until he was unable to clearly distinguish objects in his room. This continued until ten o'clock the next morning, when his vision gradually returned. On the 27th of September a second intravenous injection of 6 decigrams of salvarsan was given. No deafness, nor tinnitus, except the deafness in the left ear, was experienced until one month after this injection, although during this period he suffered considerably from dizziness, but no headache.

His attention was first called to his right ear when he noticed one morning while wiping it with a towel that it seemed "dead," and he could not hear the towel passing over it. Within four or five days a "dull sounding," as he expressed it,

commenced in the right side of his head. About this time a pain developed in his left shoulder and in the region of his heart, which was dull and constant during the day, but became more acute at night. This has been better of late, but the deafness and tinnitus still persists.

The following is the report of an examination made on the 12th of December:

Large perforations in both tympanic membranes; no discharge present. The sound from tuning forks placed on the vertex and on the right mastoid is referred to the left ear. No forks can be heard in the right ear. With Bárány noise apparatus in left ear, loud voice, all pipes and whistles can be heard, 1 foot right. Upper tone limit right ear equal 6.0 Galton. In the left ear the upper tone limit is normal. Lower tone limit equal 90 V. S. Acoumeter equal 2 inches; whisper equal 1 foot. Caloric reaction negative in the right ear; markedly positive in the left. The eyes reacted equally on rotation to the right and left, the after-nystagmus lasting about twenty-five seconds in each instance. Eye examination: Vision, O. D. 20/15; O. S. 20/15. Slight blurring of discs above and below, "probably not pathologic."

On the 4th and again on the 8th of January he had a third and a fourth intravenous injection of 6 decigrams of salvarsan, making in all four intravenous injections of salvarsan of 6 decigrams (about 9 grains) each, during the time from July 19th to January 8th.

Examination January 12th, 1912: Right ear, no change since last examination. Forks on right mastoid still referred to opposite side. No improvement found in hearing, though patient states that he can now hear an alarm clock in right ear, which he could not hear one month ago (probably due to improvement in left ear). Left ear now hears acoumeter at 2 feet; whispers at 6 feet.

Eye examination: Fundus normal, vision normal, field of vision normal.

Dr. Duel said this case had interested him because it raised the question whether this neurorecurrence of syphilis in the early secondary stages of the disease was due to the toxic effects of the arsenic preparation employed, or to the disease itself. In the reports which he had read of these cases, of which large numbers have been published, there seems to be

two very distinct views. Benario, who had collected the largest number, had reported 14,000 cases, in which there had been a neurorecurrence in 126. Of these, 118 occurred in the primary or secondary stage, a very large proportion of them being in the early secondary stage. The recurrence took place in the second to the eight cranial nerves in the following proportions: Auditory, 43 per cent; optic, 26 per cent; facial, 15 per cent; the balance divided among the other four. The interest to the otologist is evident from the high percentage in which the auditory nerve was involved (51 out of 126). Of this number, the cochlear branch alone was involved twenty-nine times; the vestibular alone five times (three times unilaterally); both branches simultaneously, seventeen times. The neurorecurrence occurred in 96 per cent of the cases within four months after the administration of salvarsan; 40 per cent occurring in the second month. The explanation which they gave was that the dose of salvarsan had been insufficient to completely destroy all of the spirochetæ. In support of this contention they advance the following reasons:

First, the length of time intervening between the administration of salvarsan and the neurorecurrence.

Second, the irritative and inflammatory character of the nervous phenomena, as compared with the atrophic changes observed after the administration of other arsenic preparations like arsacetin.

Third, the appearance of the affection in the early stages of syphilis.

Fourth, when salvarsan has been given in other affections the neurorecurrences have not appeared.

Fifth, the manifestations have improved or disappeared under mercurial treatment or another administration of salvarsan.

Sixth, the neurorecurrences have almost invariably appeared in cases where small or inadequate doses of salvarsan have been given.

Seventh, similar manifestations have appeared while mercury was being given.

A distinctly opposite ground is taken by Alexander in the cases reported by him. He reviewed the material that had for several years been sent to the ear clinic of the Vienna

Hospital, up to 1911, and since that date the cases which came under the observation of Prof. Finger. He considered the trouble directly attributable to the toxic effects of salvarsan. He states, in concluding his paper, that, in his opinion, great caution should be used in the exhibition of salvarsan in specific cases, in which there has been or is present any acute disease of the auditory nerve. He believes that "an unfavorable influence is also to be feared in cases of acute syphilitic affection of the auditory nerve in old cases of syphilis or latent chronic syphilis." In cases of hereditary syphilis it is also to be recommended, in the presence of acute manifestations of trouble with the auditory nerve, to wait before giving the Ehrlich-Hata injection.

On the other hand, in cases of chronic syphilitic affections of the auditory nerve with slight impairment of hearing and considerable tinnitus, and in cases with vestibular vertigo, he believes that the nervous manifestations cannot be attributed to the remedy. He reports good effects following the remedy in chronic labyrinth disease in chronic syphilis.

DISCUSSION.

DR. HARRIS remarked that in his opinion the society was indebted to Dr. Duel for bringing the patient before it. To his mind, this presents the most interesting and most important subject in connection with the use of salvarsan. It is being discussed very actively on the other side of the Atlantic, but in this country the question does not seem to have presented itself with any such acuteness as it has in Europe. There they are considering this, as Dr. Duel intimated, in a very careful manner. This paper of Alexander's is considered very significant by Dr. Harris. If he recalled correctly, Dr. Alexander spent six years in going over the statistics of all the cases of syphilis that appeared at the Ear Department of the General Hospital in Vienna, and at the Polyclinic. As a result he was able to find only six cases of syphilis where ear trouble had developed subsequent to the treatment. Recently at a meeting of the Otological Society in Vienna, ten cases of disease of the internal ear were reported following the use of salvarsan, and occurring in the course of a few months. As Dr. Duel stated, opinion is very much divided whether it is a case of post hoc propter hoc or not, but when

Ehrlich was consulted, he advanced, as an explanation, that it was probable that the vessels connected with the ear were so obstructed on account of endarteritis that they did not receive the full effect of the salvarsan. The cases, as regards permanent deafness, have been very variable. In one case, reported in the *New York Medical Journal,* first the right ear was affected, but after mercurial treatment it regained its use. The patient had all the symptoms of a labyrinthine disease. A matter of three months later the left ear was attacked, the same treatment was instituted, but no improvement was made. The man remains stone deaf in that ear. The question of the amount of salvarsan which is given, whether it was because it was an insufficient dose or not, has been very thoroughly tested by additional doses being given with the hope of clearing up the trouble, but it has not by any means cleared up the disease. Dr. Harris has gained from his readings that this aural complication only developed in the early first stages of syphilis. It is, however, now being reported that there are cases on record where labyrinthine disease has followed the use of salvarsan in advanced stages of the disease. He reported at the last meeting of the society the use, in a more or less experimental way, of salvarsan in a case of otosclerosis. There were no symptoms of syphilis, only a gradual increase of the deafness. The Wassermann was positive. There was immediate improvement following the use of the drug, which has been maintained up to the present time. The improved hearing was shown not merely by the patient's statement, but by the comparison of the actual tests made with those made at the time he first came to his office. The Wassermann did not change from positive to negative.

Dr. Gruening inquired of Dr. Duel whether the eyes of the young man had been examined, and if there had been blindness.

Dr. Duel replied that he had copies of the eye charts. No tests were made at the time of complaint. The impaired vision which he had reported had occurred previous to the tests. The patient's field of vision was apparently normal at the present time.

Dr. Gruening referred to a case seen in the Eye Clinic of the New York Eye and Ear Infirmary the previous week. The patient was a young woman in the clinic who had syphilis and

who had received one injection of salvarsan. She had no eye symptoms before the injection, but within a week after the injection of salvarsan she had an optic neuritis of the right eye and iritis of the left eye. He never saw this combination before. The patient has lost the sight of the right eye completely. The optic nerve was found to be atrophied, and the iritis has not yet subsided.

Dr. Dench noted that the dose of salvarsan in this case had been given intravenously, and added that a verbal statement had been made to him by a New York doctor, who has had the largest experience with this drug, that in most of these cases where optic neuritis or neuritis of the auditory nerve occurred, it was due to fault in the technic, the drug being given subcutaneously and not intravenously.

Dr. Bacon stated that the subject of Dr. Duel's report was particularly interesting to him because he had been called in consultation about a year ago on a similar case. He did not recall the exact facts, but there was a primary lesion, and about three months later the deafness developed in one ear. The labyrinth was affected. A Wassermann was taken at the time and was negative. In his opinion the deafness was probably due to salvarsan given at that time. No further particulars have been heard, except that the hearing has improved, and further manifestations of the disease have appeared. According to his experience in cases of sudden deafness, it has been in the later stages of syphilis that the deafness comes on, and not so near the time of the primary affection, and he believed at the time that the salvarsan had produced the trouble. He will obtain the exact particulars of the case, and would like to report it further at some future meeting of the society.

Dr. Gruening stated that in his experience absolute deafness is not a symptom of the early stages of syphilis. He has no remembrance of a case where deafness has occurred except in the advanced stages of the disease.

Dr. Duel said that in both cases reported by him, neurorecurrence had taken place in the early secondary stages, and this had led him to look up the literature. He had been greatly surprised at the number of reported cases which had suddenly lost the function temporarily in a good many of the cranial nerves, subsequent to the ues of salvarsan. The rea-

sons which Ehrlich gives, and which Benario cites as support to the belief that the trouble with the nerves is always syphilitic, was most pertinent in connection with what Dr. Gruening had just said. The length of time between the administration of salvarsan and the neurorecurrence had been in most reported cases one to two months (in this case, two months) subsequent to the injection. This patient had received 9 gr. at the first dose, and altogether 36 gr., so the recurrence in this case at least could not be ascribed to the small dosage. He considered this a fertile field for further investigation.

Dr. Sheppard inquired whether in the light of this literature we should give salvarsan in labyrinthine deafness due to syphilis.

Dr. Duel replied thata Alexander strongly opposed its use in any case of syphilis where any manifestations of labyrinthine trouble exist.

Dr. Sheppard stated that the case he had in mind was one that had come to him after two years of treatment appropriate to chronic middle ear catarrh. The patient was a young man, 19 years of age, absolutely deaf. The tests showed labyrinthine deafness. A gummi was breaking down on the posterior nasopharyngeal wall, and other manifestations were present. The labyrinthine deafness not being acute, he had wondered whether it would come under this heading or not, but had advised salvarsan, followed by mercury and iodid of potash.

Dr. Duel, when Dr. Sheppard described the case he had in mind, replied that, from what he had read, he thought that Dr. Alexander was not averse to the use of salvarsan in such cases.

Dr. Kenefick remarked that a possible explanation for the untoward effects of salvarsan had just occurred to him during the discussion, which he had not come across in any of his readings on this subject, nor heard mentioned in any of the meetings. The fact that neuritis can occur from various forms of toxemia, for example in appendicitis, or neuritis of the optic nerve in influenza, or autointoxication, and in connection with other toxic conditions of the blood, is well known. In the administration of salvarsan, it seemed to him that not only the metal poison introduced, but the effects of this poison, had to be considered, and in connection with this prob-

lem he had occasion to look up the subject of the administration of salvarsan to infants. The primary objection to the administration of this remedy to very young infants is the amount of endotoxin formed in the blood, due to the death of the spirochetes. Was it not possible that in the early untreated stages of this disease in adults there are more spirochetes to be destroyed and hence more endotoxins set free in the circulation? This endotoxin being a very active one, might account for some of the untoward changes which take place in the finer ocular or labyrinthine apparatus, where its presence might cause injury beyond repair.

DR. GRUENING, in response to Dr. Sheppard's query with regard to the spirochetes, said that it would appear from this theory that the dead spirochetes were just as bad as the live ones.

Division of the Auditory Nerve for Persistent Tinnitus.

DR. DENCH stated that he had had the pleasure of reporting to the society, two meetings previous, a case of division of the auditory nerve for persistent tinnitus. The patient had remained away for four months and then returned. He regretted to report that the tinnitus still remained, but was not as bad as before the operation. He showed a photograph of the original section of the parts. The operation upon the cadaver had been done several times before it was performed on the living subject, and the picture was taken subsequent to the operation on the living subject. The result was a very good anatomic drawing, which might prove of interest to anyone contemplating carrying out the procedure.

DR. TOEPLITZ reported a case of

Mastoiditis Followed by Meningitis.

The case presented nothing extraordinary, but was peculiar so far as the diagnosis was concerned.

The patient was a man, 60 years of age, suffering from symptoms very vague. In fact, he had no complaint. He had been under treatment for six weeks with some doctor in New York, for the right ear. As far as could be ascertained, he had had a cold and some pain in that ear, and had gone to this doctor, who had been able to find nothing out of the way in the ear; upon paracentesis no running at any time. The

patient did not improve, and presented himself to Dr. Toeplitz the 27th of December. The case presented slight edema behind the right ear, and the auricle was standing off somewhat. The drum membrane was not inflamed. The watch could be heard at about two inches; temperature, 99.4°; pulse, 90. The patient had no other symptoms, nothing to guide Dr. Toeplitz in making a diagnosis of mastoid abscess, but he felt sure the man had mastoid trouble, and advised operation, and that immediately. The operation was performed the next morning. Immediately before the operation, when the patient was seen by Dr. Toeplitz, there was no standing off of the ear, no edema, no pain, nothing to lead one to think that an opening was necessary. Upon opening the mastoid from the outside, the periosteum was normal, also the bone. With a chisel an opening to the depth of one inch was made, and pus was coming from the bottom under pressure. Upon removing the tip, the pus was found to be extradural. The pus was actually lying on the outside of the brain. The sinus was exposed and at one time during the operation was bleeding, which soon stopped. The operation was finished and there was no more bleeding. The sinus appeared perfectly normal. The man recovered very well from this operation, but thirty-six hours later the temperature rose to 103,° and the pulse dropped as low as 76. The case had the appearance of meningitis, and two other doctors were called in consultation. The case was diagnosed to be suppurative meningits. A lumbar puncture was done, and the spinal fluid was found to contain pneumococci. The patient died four days after the operation, the day after the consultation. No suppuration from the ear was to be seen at any time. No examination was made of the pus.

DISCUSSION.

Dr. Gruening remarked that this case reminded him of a case, previously reported by him to the society, of persistent otitis occurring in a man as a result of sea bathing. The otitis subsided and the disease became subacute. A week later edema apeared upon the mastoid, confined to the apex of the mastoid. The man heard badly, slept badly, and complained of headache. The drum healed, but there was some inflammatory process in the mastoid. He decided to open it without delay. The bone was found to be hard. The whole apex

was removed, and behind it a cell filled with streptococcus pus was found. This would not have been discovered if the apex had not been removed. Edema, in his opinion, should be mentioned more frequently as a symptom of mastoiditis. In former times it was held to be very important. Now it is hardly mentioned at all.

Dr. Toeplitz here added that the edema in his case was not on the apex, but was over the antrum.

Dr. Sheppard inquired whether, in the experience of the members of the society, the absence of suppuration from the tympanic cavities is an exceptional occurrence. He has met with it so often that he has come to regard mastoiditis without suppuration from the tympanic cavity as frequent.

Dr. Harris remarked that the absence of suppuration from the middle ear in mastoiditis was by no means uncommon, and is now generally recognized. Latent mastoiditis in some form is present so commonly, most otologists are on the lookout for it. The one significant symptom in latent mastoiditis is the lowering of the hearing, which is very decided in almost every case. At certain stages of the disease there has been infection of the middle ear, which passed almost immediately into the mastoid cells, and there remained latent for a time. Absence of pain is not significant. It can be entirely lacking. Edema and swelling, which are also quite common as symptoms, can be absent as well in certain cases. As regards the sinking of the superior wall of the canal, we now recognize that this is only an evidence that the mastoid cells in that region are diseased. If the disease is limited to cells in the other part of the process there need not be this characteristic sinking. Dr. Harris inquired if urotropin had been used in the case of Dr. Toeplitz.

Dr. Toeplitz replied that, although it was suggested, urotropin had not been used.

Dr. Gruening did not think that an X-ray would have been of much assistance in diagnosing this case. He has had little experience with them, but, judging from what he has seen of X-rays, it was his opinion that this case would have shown up poorly on the plate. Men have been in the habit of interpreting the picture according to the clinical diagnosis already made. It is not an easy matter to locate the trouble from the picture; in fact, it is very difficult, and enough is not known at the present time to rely entirely upon the picture.

DR. HARRIS, referring to what Dr. Gruening had said, mentioned a case seen by him with Dr. Mosher in Boston last summer, where diagnosis had not been made previously to the X-ray. The patient was an old man with ear trouble. He had been under the care of a surgeon during the spring, who was positive that there was no mastoiditis, and who refused to operate. He had few symptoms, only complaining of a vague headache. Dr. Mosher had a picture taken, which showed a distinct difference in the two mastoids, the one where the trouble was being very different from the other side. From the picture he made a diagnosis of cholesteatoma, operated, and found the diagnosis to be correct.

DR. SHEPPARD referred to the experience of himself and Dr. Stickle, showing the possibilities of being led astray by depending too much upon the X-ray. In this case the plate presented two frontal sinuses about equally large. In operating, the right frontal sinus proved to be what had been interpreted as being a small ethmoidal cell running up and covering a part of the right frontal sinus. The left frontal sinus extended over behind the right and was equal in extent on both right and left. Had the operation been performed, relying solely upon the X-ray, they would have been very sadly misled.

DR. DENCH stated that he had seen three cases last year, all before the X-ray plates were made, and in each case the trouble had been located exactly where cloudiness appeared on the plate. In one case the shadow was in the proper place, but was black in color instead of white. In several obscure cases, also, the pus was found to be exactly where the shadow appeared on the plate.

DR. KENEFICK inquired if the symptom of headache had been present He insisted on this symptom as of great importance in the diagnosis of these cases. The patient may be entirely free during the day, but at night there is a characteristic disturbance of sleep, caused by headache, in suspicious cases of mastoiditis.

DR. TOEPLITZ, in conclusion, added that there was one point which he would like to emphasize. He is fully aware that there are a great many cases which do not show much suppuration at any time before the mastoiditis is recognized and operated for. In this case no trace of suppuration was found

at any time, which is rare. Most cases can be traced through some suppuration. There was some sagging of the canal, but not very much. There was a slight headache, also, which was not mentioned until after the operation, when Dr. Toeplitz was informed by the wife that her husband had complained of it at night, and it was because of his restlessness that she had suggested that he go to Dr. Toeplitz.

Sinus Thrombosis.

Dr. Kerrison reported a case of infective sinus thrombosis upon which he had operated a year ago and which had presented unusual features. The patient, a boy of 9 years, seen in the Willard Parker Hospital, was suffering from scarlet fever. Both ears became infected and bilateral mastoiditis developed. Both mastoids were operated upon. During the first few days following the operation the condition improved; the child then gradually became septic. Loss of vitality and increase of septic symptoms were progressive. There was a question as to whether the sepsis was due to the aural lesion or to the scarlatinal infection, some of the medical attendants holding the latter view. Finally, as the result of a consultation, it was decided to operate upon the right sinus as offering the only theoretic chance of recovery. The child's condition, however, was so serious that the prognosis in either case was considered exceedingly unfavorable. Opening the right sigmoid sinus was followed by free bleeding, both from the torcular and jugular bulb end. Upon the hypothesis that the infection might be due to a parietal clot in the bulb, it was decided to remove the jugular vein. Exposure of the jugular vein low in the neck revealed a vessel of abnormally large caliber. The lower end of the vein had been ligated and the vessel exposed for about one and a half inches above this point, when the anesthetist reported that the child was rapidly sinking, the radial pulse being almost imperceptible. It was decided, therefore, to terminate the operation at once and not carry the dissection above the facial vein, as usual. The portion of vein already exposed—about an inch and a half in length—was resected. The resected portion was later examined and the intima was found covered by an inflammatory exudate. The child was taken from the table in an apparently critical condition. For three days following the opera-

tion the child hovered between life and death, the temperature maintaining its septic character. It also developed this unusual feature—the whole right side of the face became edematous, the nasal veins on both sides and a vein connecting the two over the bridge of the nose stood out like cords, and various small superficial veins were engorged, showing as a network under the skin. The speaker had endeavored to have this condition photographed, but the delay incident to getting a photographer into a hospital for infectious diseases prevented the success of this attempt. Four days after the operation the temperature gradually fell to normal, after which time recovery was progressive and uneventful.

In the consideration of the differences of opinion—notably between the aural surgeons of New York and those of Boston —as to the relative advantages of resection or ligation, this case brings up some interesting points: (1) The engorgement of the tributary veins through the facial in this case was followed by no permanent continuance of the infection, and suggests the possibility that when the main blood course, i. e., the jugular, is shut off, the small tributary vessels are likely to ultimately become closed by thrombosis, and therefore not lead to continued systemic infection. (2) The very large size of the jugular in this case strongly suggests the possibility of a very small jugular on the left side. Ligating low down resulted evidently in some continuation of the venous flood through the facial and tributary veins. Had the ligation been made above the facial, would the cerebral engorgement have been greater and possibly have led to serious symptoms?

DISCUSSION.

DR. GRUENING remarked that he had read of edema occurring after tying the jugular, but has never seen it, and thought it must be exceedingly rare. He has tied both jugulars and the patient lived.

DR. RICHARDS considered Dr. Gruening's remarks to the point. He has seen and examined a large number of ocular fundi in sinus cases, both prior and subsequent to the operation, immediately after the patient has recovered from the anesthetic, and has found no difference in the condition of the fundi. He has never seen a case of engorgement following the ligation of the vein of sufficient extent to be attributed

to the ligation itself. He has, also, on two occasions, opened both sigmoid sinuses at the same operation, in each instance in children, with no unpleasant congestive phenomena occurring.

Dr. Bryant said that there are other exits from the cranium for the blood beside the jugular foramina, normally sufficiently large to carry away enough blood to prevent stasis. The blood can pass out through the mastoid foramina, the numerous small foramina all about the cranium, through the condyloid and vertebral veins, and the veins passing out of the larger foramina, accompanying arteries and nerves.

Dr. Dench remarked that he had seen optic neuritis follow a ligation of the jugular vein.

Dr. Kerrison said that the interesting point suggested by this case was that the whole physical condition following the operation would have led one to fear a continuance of the systemic infection. The case, also, suggested an interesting question, namely, whether in the case of an abnormally large jugular, i. e., so large as to make one suspect that the left vein might be either rudimentary or absent, it may not be good surgery to ligate below the facial in order to guard against serious cerebral engorgement, that is, to assume the risk of an escape of septic matter through the facial tributaries as preferable to the risk of sudden cutting off of the venous flow from the brain.

Abscess of the Cerebellum.

Dr. Richards reported a case of abscess of the cerebellum. The patient was a man who had been operated upon five months previous, and the wound had failed to heal. There was an intermittent discharge of pus, which led the operator to the conclusion that there was possibly a brain abscess, particularly in view of the fact that the patient had a slow pulse, some headache, and occasionally a subnormal temperature. In operating a perforation of the cerebellar dura was discovered leading into the cerebellum at a point midway between the posterior semicircular canal and the descending limb of the lateral sinus, and this led to a small superficial cerebellar abscess. Just below the posterior semicircular canal, leading down toward the bulb, there was discharge of a large quantity of pus which had collected about the jugular bulb itself, and which had broken through the skull into the neck. This ex-

plained the pain and induration on this area and a unilateral redness of the pharynx. At the time of operation he did not drain the abscess at all, but left the opening unpacked, as it was superficial. A wick of gauze was not inserted into the abscess of the sinus until the first dressing.

DISCUSSION.

DR. EAGLETON requested that Dr. Richards give the symptoms which had led the original physician to send the patient to him.

DR. RICHARDS replied that the wound from the first operation, four months previous, had not healed. There was an occasional intermittent discharge, which had led the doctor to believe that some deep seated cavity was emptying itself; this in conjunction with headache, slow pulse and occasional subnormal temperature.

DR. KERRISON said that the case reported by Dr. Richards was very interesting as illustrating the point of Professor Heine, of Munich, that where a brain abscess is drained by a fistulous tract, further opening of the sinus is not called for. Dr. Richards had abstained from all meddlesome surgery, to which fact probably the successful result had been largely due.

DR. GRUENING remarked that this was the opinion for a long time, and years before otology was developed. In some cases of abscess of the brain the pus discharges through the ear. He was of the belief that he had seen several cases of brain abscess discharging through the ear.

DR. RICHARDS did not think that it would have made any difference in this case to have inserted or not a gauze wick into the tract. The point most interesting was that in conjunction with the superficial situation of the abscess there was a total absence of all incoordination and vertiginous phenomena.

Case of Bacteremia.

DR. SHEPPARD referred to a case of bacteremia which he had reported a year ago, and which had been criticised at the time by Dr. Gruening. This patient had recovered from the mastoid and had left the hospital. A similar case had recently come under his observation at the hospital. The patient was just recovering from typhoid fever when first seen

by him. It was evidently a starting mastoiditis, and he advised operation, but was held up for twelve days by the medical staff before the operation was permitted. There was otorrhea, due, as remembered by him, to the streptococcus longus. The blood showed the same germ. The pathologist of the hospital advised him not even to give the patient a vaccine, because she is at present taking care of the condition without it; that is, the culture shows relatively few colonies, and the number of them is diminishing. The temperature was more or less of a septic one for perhaps five or six days after the mastoid had been operated upon. The blood became sterile within two or three weeks, convalescence has gone on satisfactorily, and the patient has now left the hospital. Dr. Sheppard desired to give to Dr. Blatteis, the pathologist, the utmost credit for his helpful watchfulness of this class of cases, and the excellent judgment he has shown in advising for or against operation, as well as in regard to when vaccines were and were not indicated.

Dr. Gruening remarked that he was exceedingly glad to know that such patients can recover without being operated upon.

NEW YORK OTOLOGICAL SOCIETY.

Stated Meeting, March 26, 1912.

THE PRESIDENT, DR. ROBERT LEWIS, IN THE CHAIR.

Injury Resulting in Paralysis of the Facial and Mental Oblivion.

DR. PHILIP D. KERRISON presented a patient giving the following history: The man, a sailor by occupation, had fallen some seven months previously into the hold of a vessel, striking upon his head and sustaining a fracture of the skull. Following this accident he was taken unconscious to the hospital and his condition for two months was one of mental oblivion. An interesting feature of the fracture was a complete facial paralysis of the right side, which had resulted immediately and was apparently permanent. This suggests a complete severing of the nerve trunk. On testing the hearing, the right ear was absolutely deaf, this test being made with the Bárány noise apparatus held in the left ear. The caloric test showed absolute loss of vestibular irritability in the right ear. An interesting anomaly was the apparently contradictory reaction to the rotation test, i. e., the after nystagmus to the right was of longer duration than the after nystagmus toward the left.

DISCUSSION.

DR. KERRISON, in reply to Dr. Dench's remarks about the Bárány noise apparatus, said that Dr. Dench's statement that the noise apparatus in some cases increased a residue of hearing power in the ear under examination, could not detract from the value of the instrument; for, naturally, if no such residual hearing power was present, this influence of the noise apparatus could not be demonstrated, and absolute deafness would be shown to exist. On the other hand, when the apparatus did have the effect of augmenting a slight hearing power in the ear examined, it simply showed absence of complete deafness. This was all that Bárány claimed for the instrument.

DR. WENDELL C. PHILLIPS said that the patient's statement

should be taken with a grain of salt, for the personal equation entered into every case. The patient naturally thinks he must hear the tuning fork better in the good ear. He regarded the noise apparatus test as of value.

DR. KERRISON demonstrated the use of the noise apparatus on a patient. There were no disturbances in equilibrium in this patient he reported.

DR. EMIL GRUENING reported a case of

Cholesteatoma.

occurring in a woman, fifty-four years of age, and whom he had had under observation for thirty years. She had cholesteatoma of the right temporal bone. She sometimes suffered from slight dizziness. He removed at times some cholesteatomatous material, and she would be better for some time. She went abroad and consulted specialists in Europe. She also had submucous fibroids of the uterus. Only last Saturday he was called to see her, and she had a temperature of 105.4° F. She also had chills and vomiting. Dr. Whiting saw the case with him in consultation, and they both excluded the ear. The gynecologist decided that the high temperature was due to the uterine condition, and the uterus was at once removed. Upon cutting into the uterus a number of fibroids were found discolored in the center, but nothing else. The pathologist reported that the uterine condition could not be held responsible for the high temperature. Soon the temperature rose to 106.4,° and the patient had another chill and again vomited. Her respirations were 44, and her pulse 140, and she was not unconscious. She had a leucocytosis of 24,400 and 88 per cent polymorphonuclears. The blood culture taken was reported as negative at that time.

Here was a case of cholesteatoma in a patient with a temperature of 106.4° F., with chills and vomiting, but no local symptoms pointing to the ear. The hemoglobin was about 60 per cent, and it was thought by the men in consultation that it was necessary to examine the lateral sinus. The patient collapsed on the table and an intravenous injection was called for. She died two hours later.

Here was a case of sepsis, and it was not clear to Dr. Gruening whether it was due to the uterine condition or to

the cholesteatoma. The culture report was later positive, but he operated when a negative report was received. He could see the cholesteatoma masses lying in the upper knee of the sinus. Bleeding was very free. The pathologist examined the sinus after death. There was no clot found. The uterus will be examined.

DISCUSSION.

Dr. Frederick Whiting said that Dr. Gruening's description of his findings in the case he reported was very clear and comprehensive. The woman had no tenderness anywhere about the head, and there was no edema of the superior portion of the posterior cervical triangles. There was no tenderness under the angle of the jaw or anywhere about the head. The fundus of the eye was normal. An examination of the fundus of the ear showed it to be perfectly dry and with a wide attica. It did not seem as if this woman ever had any foul material there at any time. The drainage was absolutely perfect. There could be found no evidence of pain or tenderness, and Dr. Whiting was of the opinion that they had to look further for the cause of the infection and sepsis. The gynecologists who made the examinations stated that, in their judgment, there was sufficient in the uterus to cause the rapid and great rise in temperature. Dr. Libman did not think that the cholesteatomata was responsible for the trouble, but that the uterine condition was.

Dr. Gruening said that the pathologic examination of the uterus had not as yet been made. There was no doubt, however, but that the patient's death was due to sepsis. There was no pain on pressure anywhere in the region of the ear. The septic condition originated from some other organ, but not from the ear.

Dr. Wendell C. Phillips asked if the mastoid process was dense and hard, eburnated.

Dr. Gruening replied that it was. He was sorry that no autopsy could be obtained.

Dr. Phillips asked whether any clots were found in the sinus.

Dr. Gruening replied in the negative. The operation was practically unfinished because of the patient's collapse on the table, which followed the ligation of the jugular and facial veins. Every case of cholesteatoma must be done under un-

favorable conditions. The teaching in this case was that every case of cholesteatoma should be operated upon before such a dilemma arose.

Fever Reduced by Removal of Iodoform Gauze.

Dr. Joseph A. Kenefick reported a case that had occurred in his service at the New York Eye and Ear Infirmary. The patient, a man, 40 years of age, was operated on for acute mastoiditis; the wound made was a very large one. At the end of the operation the operator wounded the sinus, but hemorrhage was easily controlled. The man went from the operating room to the ward in perfectly good condition. However, on the following day his temperature rose to 103° F. The second night after the operation he was given a cathartic and the temperature fell to 100° F. In the afternoon of this day the temperature suddenly jumped to 104.° A blood culture was then taken. On the following day the blood report was negative, and the temperature was 103.5° F. Later in the day he was called up and was told that the temperature was 105.5° F. He then suggested that all the iodoform gauze that had been inserted into the wound be removed. This was done and the temperature immediately fell from 105.5° to 100° F. It had been normal ever since. The urine was examined for iodin, but with negative results. There were no psychic symptoms. The pulse was low, compared to the temperature in this case.

DISCUSSION.

Dr. Stephen Henry Lutz said that on Washington's birthday he operated upon a woman, and the culture taken at the time of operation revealed a streptococcus infection. The second day after the operation she had a rise in temperature to 103.5,° and on the day following it was higher. In this case there was also a large operation wound, which was packed with iodoform gauze. When the iodoform gauze was removed and replaced by plain gauze the temperature dropped. This was simply a case of iodoform poisoning. Iodin was found in the urine.

Suspected Sinus Thrombosis.

DR. GORHAM BACON reported the case, which he saw in consultation, of a young man who had a very severe attack of scarlet fever and both ears became involved and both drum membranes were incised. This patient ran a temperature. There was a bad condition in the nasopharynx, a streptococcic infection. There was no tenderness over either mastoid process. Suddenly the temperature rose to 105° F., and then a blood culture was taken, which was positive. He could not satisfy himself, from the clinical symptoms alone, that this was a case of sinus thrombosis. The temperature was lower the next day, but on the following day it rose again to 105° F. In spite of the fact that there were no other clinical symptoms beyond the temperature, operation was performed by the attending surgeon. When the mastoid was opened nothing was found in the cells nor in the sinuses. He felt at the time that one should be careful in making a diagnosis of sinus thrombosis, especially in cases of scarlet fever, from simply a rise in temperature and a positive blood culture, and that the clinical symptoms have a most important bearing on the case.

DISCUSSION.

DR. GRUENING, referring to optic neuritis due to sinus thrombosis, said that he had already published a report of a case in which all the sinuses were involved and there was no optic neuritis. The involvement of one sinus does not cause optic neuritis; this condition was caused by increased intracranial pressure. When there is an occlusion of a sinus with increased intracranial pressure and a serous meningitis with it, then an optic neuritis may be observed.

Frontal and Ethmoid Disease Complicated by Albuminuria.

DR. JOHN A. MACISAAC reported the case of a patient who appeared in his clinic with an involvement of the frontal sinus and the ethmoid cells. He obtained a very good X-ray plate. The examination of the urine revealed albumen and casts. The patient was afraid of an operation. There was a great deal of pain and the patient was quite ill. At last an operation was consented to, the frontal sinus was opened and he removed a polypus from it. He found much pus in the

sphenoidal sinus as well. The patient was under the influence of ether for over two hours, after which she was placed in bed. For some weeks the patient was very ill with swelling of the feet, of the knees, face, etc. One month after the operation the patient left the hospital and appeared to be all right for three years, during which she came back a number of times to have her urine examined. The albumen and casts entirely disappeared. About one month ago the patient returned with an attack on her left side; there is a sphenoiditis and an ethmoiditis, and the kidneys are again involved as well, and I am afraid to undertake an operation a second time. But on hearing the interesting report of the previous speaker, I will do the Killian operation on the left side, to relieve her, if possible, and also to see what result it will have on her kidneys.

Acute Nephritis Caused by Grippe Infection.

DR. GORHAM BACON reported the case of a child he saw several years ago who was suffering from grippe and who had an infection of both ears; the ears after incision discharged freely. It was noticed soon afterwards that the eyelids were swollen; the child suffered from an acute nephritis, undoubtedly caused by the grippe. The mastoids on both sides became involved. It seemed to him to be a very serious case for operation, because of the large amount of albumen in the urine. From the symptoms it was evident that one or both sigmoid sinuses were involved; he opened both mastoid processes and found considerable involvement of the cells. On the side that was the more involved he found a clot in the sinus. The child made a good recovery. In these cases of socalled grippe infection one occasionally meets with cases of acute nephritis, to which attention has been especially called by Dr. Eagleton.

Swelling Over Mastoid for a Year.

DR. WILLIAM C. BRAISLIN presented a photograph of an interesting case. The history obtained was that the patient had had a swelling over the mastoid for one year. To this swelling a poultice of soap and sugar, home made, had been applied. When he saw the patient there was an ulceration over the mastoid. This man had been treated in various dispensaries for tuberculosis, and in spite of all that had been done for him

the ulceration extended over the front of the ear and below it with involvement of the glands, several of which sloughed out entire. At one time the ulceration extended completely around the meatus and the cartilaginous portion of the ear. Whatever was done seemed to result in failure. The discharges were examined repeatedly by the pathologist, but no tubercle bacilli were found; still they felt satisfied that this was a tuberculous ulceration. Dr. Murray reported that in these cases it was not uncommon not to find the tubercle bacilli in the discharge. The patient was not admitted to the Brooklyn Eye and Ear Hospital, because tubercular cases are excluded from the wards. Wet dressings of 1 to 5,000 bichlorid solution of mercury were applied several times daily, and under this treatment the ulcerations became smaller and smaller, and at last the only thing left was a small, rough looking scar, but the condition, much to their surprise, healed up.

DISCUSSION.

DR. EDWARD B. DENCH asked if radium or the X-rays had been used.

DR. BRAISLIN replied that at the time the patient was treated the hospital was without an operator to use the X-ray machine.

DR. MAX TOEPLITZ has seen in a case of tuberculosis of the lungs complicated by dermal tuberculosis on the hands and forearm the application of the X-rays heal the condition of the hands and forearm.

DR. WENDELL C PHILLIPS reported several interesting cases as follows:

Herpes Oticus.

J. N., age 55 years, had a sudden onslaught of pain in the right ear. A herpetic eruption confined to the anterior portion of the auricle and the external auditory canal had appeared soon afterwards. Two days after the first symptoms a complete facial paralysis had appeared upon the same side. The pain was extremely severe and radiated over the right side of the head and mastoid region. The eruption followed the usual course of about ten days, during which the pain gradually subsided and the facial paralysis gradually improved and recovery took place in about one month.

This man had for over a year been under a severe mental strain from business reverses.

Dr. Phillips recalled that Dr. Ramsey Hunt had collected 56 cases of herpes oticus in which the facial paralysis had accompanied the herpetic symptoms. Hunt believes the condition to be a posterior poliomyelitis of the geniculate ganglion and classifies herpes oticus as follows:

(a) Herpes oticus.
(b) Herpes oticus with facial palsy.
(c) Herpes oticus with facial palsy and hypoacousis.
(d) Herpes oticus with facial palsy and Ménière's complex.

Purulent Labyrinthitis With Fistula of the Horizontal Semicircular Canal.

S. W., female, about 30 years old. Had suffered many years from chronic purulent discharge from the left ear. She had suffered for some days from attacks of nausea and vertigo, and it was for these latter symptoms that she consulted me in January, 1912. Upon examination it was found that the cochlea was not functionating, and she had no spontaneous nystagmus. The fistula test revealed that compression caused lateral nystagmus to the left and no conjugate deviation. Rotation positive, and diagnosis of fistula. She had the radical mastoid operation performed, and the fistula was found in the upper part of the horizontal semicircular canal. Dr. Phillips did not operate upon the labyrinth. For several days following the operation she complained of considerable vertigo, and she had spontaneous nystagmus to the opposite side. She had, however, gradually improved and was now apparently well and attending to her usual duties.

Dr. Phillips also called attention to a series of

Radiographs of the Mastoid Process in Health and Disease,

which he was having made at the Manhattan Eye, Ear and Throat Hospital. Dr. Law was doing the work. A very interesting radiograph of the normal mastoid process had been taken during the last week by Dr. Law, which gave a clear view of the mastoid cells, lateral sinus, and, strange to say, the angle had been so arranged that the malleus was plainly visible. The radiographs of the diseased mastoid

process had proven most satisfactory, and especially in locating the extent of the disease, the size of the mastoid process, and the location of the lateral sinus.

Suppurative Labyrinthitis.

Dr. T. Passmore Berens reported the case of a patient, 45 years of age, who had had vertigo for two days, with a discharge from the right ear. The patient claimed that never before was there any discharge from that ear. Carefu inquiry, however, into the history of this patient revealed the fact that there had been quite a free discharge from the right ear intermittently for many years. On that side the individual was completely deaf, probably for years. There was present a perforation of the membrana tympani and a rotary nystagmus to the left. He was unable to stand because of his vertigo. He had a temperature of 100° F. A Schwartze-Stacke operation was performed, the external semicircular canal was uncapped, the vestibule and the cochlea exenterated. Pus was found in the semicircular canal. The man made a good recovery.

Dr. William Sohier Bryant made a supplementary report of a case of

Cerebrospinal Meningitis With Brain Hernia Following Decompression Operation.

living seven months after the operation. The patient was still alive, but not very strong, and he was doubtful of the outcome. He said he would report the conclusion of this case at a later meeting of the society.

Case for Diagnosis.

Dr. James F. McKernon reported the following: Boy, aged 17 years. Intermittent discharge from both ears for two years. Had never had any diminution of hearing. Awoke five days ago unable to hear from either ear. Physical examination disclosed an eczematous condition of both meati and auditory canals, with considerable swelling of the deeper structures of the canals; scanty discharge, mucopurulent in character, present. Both membrana tympani very black in

color, with small perforations on right side, in posterior inferior quadrant, and in left, in anterior superior quadrant, on a level with short process of malleus. Hearing negative to all tests. Rotation to left produced slight nystagmus, horizontal in character, to opposite side. Rotation to right, negative. Cold caloric to right produced slight and transient vertigo. Cold caloric to left, negative. Fistula test, negative. Wassermann's reaction, negative. Case placed under observation for diagnosis and treatment.

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

The Nervous Diseases of Tobacco Users.

FRANKEL-HOCHWART, Vienna (*Deutsch. med. Wochenschr.*, No. 49, 1911). In a very complete referat before the German Neurological Society, for 1911, Prof. Frankel-Hochwart reviews the subject of the influence of nicotin on the nervous system. It is surprising how little original work has been done on this important matter, as it affects the ear and the mucous membranes of the upper air passages. There is but one case reported in the French literature, and in modern times Alt has reported three important cases. The author himself has seen several cases of nervous deafness due to excessive tobacco using, and the occurrence of severe tinnitus with negative findings in the ears is fairly common. The so-called nicotin dizziness is certainly of a vestibular origin, and even the development of a true Ménière's complex has been observed. One of his own cases is here quoted. Lately Bárány, Voss, Neumann, Beck and the other have had cases of Ménière's without involvement of the acusticus. The author also reports a case of deafness due to tobacco which closely resembles the angioneurotic deafness of Politzer. Frankel-Hochwart describes it as an intermittent stuttering of the auditory nerve, similar in character to the dysphasia which Oppenheim has described. *Horn.*

The New Symptom Complex of Bárány.

BÁRÁNY (*Deutschen. med. Wochenschr.*, March, 1912) during the last year has discovered a new symptom complex, which he has had an opportunity of studying in thirty cases. When the trouble is situated on the right side and has reached its full development, the following complex of symptoms has been observed: 1. Headache in the right posterior cranial fossa, especially directly behind the ear, the pain beginning in the mastoid and radiating forward. 2. Pressure tenderness over the mastoid, especially at the point of exit of the nerves.

3. Attacks of dizziness. 4. Lowered caloric irritability of the right labyrinth. 5. Right-sided deafness, taking on the character of a nervous deafness. 6. Right-sided tinnitus. 7. With the palm of the right hand facing downwards, spontaneous "pointing-bye" sign, that is, the finger points to the right side. 8. A spontaneous nystagmus to the right having been brought about, the pointing reaction to the left, with the right hand, is absent. 9, 10, 11. In a few cases there is a lowering of the pulse rate, a diminution of the corneal reflex, and the appearance of cerebellar pontine symptoms on the right side. As peculiarities are to be especially noted: (a) The sudden beginning, the spontaneous changes, and sometimes the sudden disappearance of all symptoms of trouble. (b) The relation of the trouble to migrane and epilepsy. (c) The relation of the disease to a healed otitis media suppurativa dextra. (d) The marked influence of therapeutic measures, often complete healing, through such procedures as lumbar puncture, laying free of the dura, and, as a last resort, the incision of the dura in the posterior cranial fossa.

According to Bárány's idea, the etiology of this complex is a circumscribed collection of fluid in the cisterna pontis of the cerebellar pontine angle. These symptoms can be influenced through a marked flattening of the posterior cranial fossa (one case); through temporary closure of the foramen Magendie (one case); possibly through an adhesion of the pia and arachnoid, following a serous meningitis (the majority of the cases). The relation of the ear symptoms to the "pointing-bye" symptoms in the wrist joint is probably due to the fact that the cerebellar cortical center for the inward movement of the wrist joint is situated in the region of the cisterna of the cerebellar pontine angle. The paralysis of this center, through excessive pressure in the cisterna, causes a spontaneous "pointing-bye" to the right and a failure of the pointing reaction toward the left. This has been proved by cases where an incision of the dura in this region, following a labyrinth operation, produced a "pointing-bye" symptom in the wrist joint of the diseased side. If the symptom complex disappears spontaneously or as a result of a surgical procedure, then the headache, dizziness, deafness, tinnitus, and "pointing-bye" symptoms also disappear in a few days. In some cases the recovery of the hearing is delayed or fails to

take place. Recurrences are always possible, but as yet have only been seen in a few cases, and then only after periods of from one to three years. *Horn.*

The Occurrence of Nystagmus With Erysipelas.

RUTTIN, Vienna (*Zeit. für Ohrenheilkunde,* Vol. 44, Heft 1), has found that nystagmus occurs very commonly with postoperative erysipelas following ear operations. The following conclusions are drawn:

1. Spontaneous nystagmus is a common symptom of postoperative otitic erysipelas.
2. The cause of the nystagmus can be due to a serous meningitis, but is always intracranial in origin.
3. The direction of the nystagmus varies greatly; it can be toward the well or diseased side, towards both sides, or directed upward or downward.
4. The appearance of the nystagmus can precede the reddening of the skin or follow the full development of the disease.
5. The disappearance of the nystagmus takes place just before the fever falls, or together with the lowering of the temperature.
6. The nystagmus only continues a few days, at the beginning and during the fever. *Horn.*

Operation and Aftertreatment of Acute Mastoiditis.

BONDY, Vienna (*Trans. German Otological Congress,* 1911, p. 332), attempts to throw some new light on the question of when we are in a position to close the posterior wound after an operation for acute mastoiditis and secure union by first intention. He bases his conclusions on a series of fourteen cases, which he examined bacteriologically, and declares that by knowing the kind of bacteria present we are in a position to tell whether a case can be completely closed or whether it must be left open.

In six of his cases he found streptococcus pyogenes; in five cases, streptococcus mucosus; in one case, staphylococcus pyogenes aureus; in one case a diplococus, and in the remaining cases the culture was sterile.

The course of the cases infected with the streptococcus

pyogenes was invariably favorable. At the first dressing the external canal was dry, there was a slight discharge of bloody serum from the lower angle of the wound, which dried in a few days. The average time of healing was fourteen and one-half days.

The other seven cases infected with the staphylococcus pyogenes aureus, the mucosus and the diplococcus, had no such favorable course. In five of them the external canal was dry at the first dressing, but in all cases there was more or less pus discharging from the lower angle of the wound. The surrounding tissue was more or less infiltrated and sensitive to pressure.

His method consists in doing the operation under the strictest aseptic precautions, opening the antrum very wide, and removing every particle of diseased bone. The wound is then very lightly packed with iodoform gauze, the strip brought out at the lower angle, and the wound carefully sutured. The first dressing is made on the third day, the gauze is withdrawn and a pressure bandage applied, without replacing the drainage.

His contraindications for this method cover all cases where there is a suspicion of intracranial complications, and cases where there is temperature at the time of the operation. By the time of the first dressing the bacteriologic report will be at hand. If the report shows the presence of streptococcus pyogenes, and the wound is doing well, the pressure bandage can be applied and the cases will heal in a very few days. If the other bacteria are shown to be present, and the wound shows pus, then the drainage must be used in the ordinary way. In the discussion which followed, Prof. Prysing, of Cologne, and especially Prof. Kummel, of Heidelberg, took exception to the conclusions as based on insufficient data, but the majority of the members discussing the paper seemed to incline to the belief that the primary suture of the wound in these cases was of considerable value. *Horn.*

The Conservative Radical Mastoid Operation.

STACKE, Erfurt (*Trans. German Otological Congress*, 1911, p. 343), outlines the exact indications for this procedure, which has now come to be recognized as a distinct advance in the realm of mastoid surgery. In the discussion, in which

Bárány, Panse, Wittmaack, Bondy and others took part, there was no dissension from his conclusions, which are here given in full.

The technic of his method is about the same as the Bondy operation, which has recently created so much favorable comment, except that he passes his protector from the external canal through the perforation in Schrapnell's membrane and works from there backward, while Bondy performs the operation in the usual manner of doing a mastoid. In both operations great care is exercised to avoid luxating the ossicles, and the bridge is completely chiseled away, leaving the drum to reattach itself where it will.

The main point which he makes in his paper, and which is a detail which none of the other authors have laid any weight upon, is that in order to have a successful result the middle ear must be closed and have no connection with the pus process in the attic or mastoid. This fact is easily determined by the use of the catheter. At first glance it may be thought that this condition must be one of extreme rarity, but his statistics show that it occurs in 50 per cent of all cases of cholesteatoma. In other words, the pars tensa of the drum must be intact and the perforation must be situated in Schrapnell's membrane.

His indications for the operations are briefly as follows:

The only cases which are suitable for this operation are those of cholesteatoma of the attic and aditus ad antrum. These cases occur in the following three forms:

1. Fistula high up in Schrapnell's membrane. It may be situated anterior, posterior or above the processus brevis, and may lead to destruction of the lateral attic wall.

2. Detachment of the posterior superior edge of the drum, with a secondary attachment to the labyrinth wall or the lower aditus wall, below the promontory of the facial.

3. The very rare fistula in the posterior superior external canal.

In these three groups, where the drum is intact, almost without exception we have a middle ear closed off from the pus process. The results from this operation are ideal. We have a middle ear protected by the drum, the aditus ad antrum fully shut off and epidermitized. The hearing is generally vastly improved. In the author's fifty cases, twenty were improved, twenty-four remained unchanged, two were made worse, and five are still under observation. *Horn.*

Vaccine Therapy in Diseases of the Ear, Nose and Throat.

VIRGINIUS DABNEY (*New York Medical Journal*, February 10, 1912) has tested vaccines in 200 cases. The local and general reaction, the temperature, and the patient's metabolism have been the sole guide to the size and frequency of the dose. Injections were repeated at intervals of from four to seven days, and increased one-third, depending upon the reaction. He gives the histories of a number of throat and ear cases treated with good results by vaccine.

The author's conclusions, as a result of his work with vaccines, is to the effect that while no claim for infallibility is made for vaccine therapy, it is of decided value. It is intended to supplement other therapy rather than as a substitute for it, and he sees no inconsistency in such combined treatment. Proof is not wanting to show in acute and subacute otitis media, stubborn slow healing sinuses following a mastoid operation, all forms of tonsillar infection and furunculosis of the auditory nerve, that vaccines will surely abbreviate convalescence.

He concludes that in his opinion no method devised in the past ten years for the care of otitis media has shown the excellent effects and given the brilliant promise of vaccine therapy. *Harris.*

Vertigo From the Standpoint of the General Practitioner and the Otologist.

EDWARD BRADFORD DENCH (*New York Medical Journal*, January 6, 1912) classifies oral vertigo as follows: First, cases due to a chronic nonsuppurative inflammation of the middle ear; second, cases due to a residual suppurative inflammation of the middle ear; third, cases due to an early suppuration; fourth, cases due to an involvement of the auditory nerve trunk, as a result either of a specific inflammation involving the nerve trunk, or due to a degeneration of the end organ of the auditory nerve as the result of some middle ear inflammation, or of some general diathetic condition. He gives cases to illustrate each of these classes.

It is his belief that in cases of vertigo falling under the third heading, operation should always be deferred until the acute symptoms have subsided, unless there are signs of a diffuse suppurative labyrinthitis, as evidenced by high tem-

perature. In these cases immediate operation should be performed. He reports, as illustrating vertigo due to chronic suppuration, a patient who was deaf in one ear and suddenly became dizzy and almost entirely deaf in the other. In spite of the labyrinthine symptoms he was inclined to regard the case as one of perilabyrinthitis, and performed only a radical operation without entering the labyrinth. There was prompt improvement of the hearing following the operation. It is the author's opinion that the proportion of cases in which labyrinthitis is the cause of profound deafness may be comparatively larger than we have been led to believe, and in the absence of symptoms which make an immediate labyrinthine operation imperative, it is wise to assume that the symptoms are due to the inflammation of the perilabyrinthine structure, and it is wise to operate with this in view rather than to perform an immediate operation upon the labyrinth. It is the author's belief that in a very large proportion of cases where we can exclude specific disease or a neoplasm at the base of the brain involving the auditory nerve trunk, vertigo is due to some underlying disease of the middle ear or labyrinth. In such cases relief has frequently been obtained by the internal administration of pilocarpin in small doses. *Harris.*

The Pathology of Deafmutism.

G. HUDSON-MAKUEN (*New York Medical Journal,* June 8, 1912) refers to the different forms of mutism which exist, including psychic and idiopathic mutism, and speaks of the small amount of work which has been done in the pathology of deafmutes; in all, not more than 150 postmortem examinations on deafmutes showing positive results have been reported. He concludes his discussion on the subject as follows: "Histologic studies of the auditory and phonatory tracts have revealed the morbid anatomy of deafmutism, and thus placed our knowledge of the subject upon a more or less scientific basis, but have failed utterly to point the way to any definite conclusions with regard to the etiology of the affection and to its treatment. They do not enable us to distinguish between socalled congenital and acquired deafmutism, and there is very little to be found in the pathologic processes themselves which is suggestive of the particular disease or diseases which caused them. Deafmutism is not a disease, but the result of

a disease; or, rather, it is a result once removed. It is the result of a result, the disease itself having long since run its devastating course and left behind the morbid processes upon which the final result, deafmutism, depends. Although these morbid processes are plainly visible in postmortem examinations, they have in themselves no features sufficiently distinctive to enable us to draw any satisfactory conclusions. We cannot always be sure that they are not purely accidental anomalies, or merely unimportant variations, and until they are compared and correlated with histologic studies of normal auditory and phonatory tracts, and with previous clinical histories of the subjects examined, their value must ever remain exceedingly limited."

The author agrees with Love, that future progress in this line of work will come from closer study of the diseases which are responsible for the morbid anatomy of deafmutes, rather than from a further study of the morbid conditions themselves. *Harris.*

New Investigations on Otosclerosis.

FERRERI (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie*, January and February, 1912) is of the opinion that otosclerosis, which is a primary affection of the labyrinth capsule, consisting of the new formation of bony tissue and later a reabsorption of the bone, represents a hereditary process or a latent autointoxication of rachitic or osteomalacic origin, concerning the infectious nature of which there can be no doubt. He refers to his previous observations that otosclerosis is most wont to occur among malacic women, who were confined too young or who had nursed their infants too long, and is of the opinion that the disease is most wont to develop at the time of pregnancy. He has now carried his investigations further, and believes that instead of the disease developing in adult life, it in reality exists at an embryonic period. Upon this theory he has selected children deaf or hard of hearing, who have presented themselves at his clinic, who showed either signs of rickets or of hereditary syphilis. These he has treated with the antiricketic vaccine. The injections are practiced once a week, usually in the mastoid region. The treatment must be carried out for a long time in order to prevent a relapse. He gives a report of four cases thus treated. In all of them the hearing was improved as the result of the injections. *Harris.*

A Case of True Seroleptomeningitis Cured by Operation, With Considerations Upon This Interesting Otitic Complication.

CITELLI (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie*, January and February, 1912) reports the case of a girl of 15, who had had suppuration from the ear since childhood. When seen by the author there was rigidity of the neck with pain, accompanied by vomiting, and a depression of the sensorium, and high fever. The examination showed the drum membrane entirely lost. The girl responded badly to questions which were addressed to her. Pressure over the antrum gave pain; positive Kernig; an optic neuritis more pronounced on the side of the diseased ear was present; operation the next day. The antrum was found full of pus, the ossicles were lost, the sigmoid sinus was bathed in a small quantity of pus, posterior to the sinus, extending over 2 cm., the cerebellum was covered with granulations invaded by pus. A radical operation was performed, and the sigmoid sinus as far as the jugular bulb and the entire area of the affected meninges involving the cerebellar fossa was uncovered. Although neither the sinus nor the dura mater showed pulsation, in the absence of the signs of pyemia, Citelli did not open them. The operation was concluded by a lumbar puncture, which showed the cerebrospinal fluid under an increased pressure. The fluid was neither markedly transparent nor opaque. The cultures showed the fluid entirely sterile. Microscopic examination, on the contrary, gave clear symptoms of leptomeningitis, numerous leucocytes and a large quantity of polynuclear cells. The pus from the field of operation contained staphylococci and diplococci. Prompt improvement followed the operation, and the patient made an uninterrupted recovery.

Based upon this case, Citelli enters at considerable length into the differential diagnosis of serous meningitis, and concludes as follows: That serous meningitis of otitic origin does exist, but it is rare, and it is difficult to discover it at the serous period, which is always very brief. It is not to be confused with meningitic accidents ascribable to a meningoventricular edema caused by trauma or by toxins, nor with a reflex congestion of the meninges. Furthermore, in the presence of a true serous leptomeningitis, if apart from the ear infection there are observed other infections, general or localized, it

will be necessary to determine if the leptomeningitis has been produced by the infection of the ear or by the other causes. In order to establish the differential diagnosis between true serous leptomeningitis and a noninflammatory hydropsia infecting the meningoventricular region apart from the evolution of the disease in other organs of the body and the results of intervention or autopsy, it is important to have recourse to a cytologic examination of the cerebrospinal fluid. Serous meningitis is not produced only by the entrance of bacterial toxins in the subarachnoid spaces or in the ventricules, as a number of authors believe. On the contrary, he is inclined to believe that it is engendered more frequently by the invasion of less virulent germs and in limited quantities. We know, in fact, that many times in patients with symptoms of otitic meningitis there have been found leucocytes and microbes in the clear fluid proceeding from the lumbar puncture, and that this condition, which denotes a serous meningitis of variable intensity, has lasted a number of days before the development of the suppurtive leptomeningitis of which the pyogenic serous form clearly constitutes the premonitory stage. *Harris.*

The Study of the Clinical Effects of "606" Upon the Inner Ear.

BARIL (*Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie*, March, 1912) has made over 700 injections of salvarsan. The accidents affecting the inner ear which he has met, he divides, first, into immediate accidents, and, second, accidents occurring after an interval of time. Of the former class he has met with two. The more typical of the two he gives in detail. The initial lesion was contracted in February. Three months later an injection of salvarsan was practiced. Three days later a second injection was made, and two days after, a third was given. Two days after the third injection the patient became indisposed. There was a hyperesthesia in the hearing, general physical weakness, vertigo, compelling him to keep in bed, headache and tinnitus. Examination showed no abnormalities in the middle ear. The symptoms continued for two weeks, when they had disappeared and he was discharged. The author regards the case as one of intoxication, with nervous hyperexcitability, where recovery was attended by an eruption on the skin and

a general crisis affecting the stomach, intestines, and kidneys, shown by a free discharge of urine. He regards the vertigo of auricular origin, inasmuch as the nystagmus tests pointed to a hyperexcitation of the vestibular nerve; second, because the headache was not occipital, but lateral; third, there was no involvement of the optic nerve.

As the result of these two cases he believes that the following points should be borne in mind: First, the necessity of examining all the organs of sense before salvarsan is injected; second, the examination of the kidneys; third, the avoidance of large doses, not giving more than 30 cg. in a single dose; fourth, an interval of from eight to ten days between the injections.

He narrates the history of a second case, illustrative of a remote accident following the use of salvarsan. This patient's initial lesion was contracted six months before the first injection. Two months later a paralysis of the facial nerve developed, with frequent nausea, vomiting and vertigo. Baril regarded these as a result of the syphilis, and advised repeating the injection. This was performed, 20 cg. of salvarsan being given. The reaction was pronounced. The headache continued severe. Gradually the symptoms improved. The third injection of 30 cg. was made, with improved condition. The nystagmus gradually disappeared, and in two months' time the patient was virtually well. This case the author regards as one of neurorecidive, and it shows, in his opinion, that while "606" cures syphilitic manifestations, it does not prevent a relapse, at least when there have been only one series of three or four injections. He is in accord with the advice of Emery, who recommends a series of injections of 30 to 35 cg., repeated at intervals of twenty to thirty days for four or five injections, and resumed at an interval of a month and a half or two months, to be continued until the Wassermann reaction becomes negative. *Harris.*

Tinnitus and Oral Vertigo of Uric Diathesis Origin, Cured by the Treatment of the Diathesis.

KAUFMANN, Angers (*Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie,* April, 1912), reports a patient, a woman aged 32 years, who gave a history of trouble with her ears in childhood. For the last five or six years there had been increasing tinnitus in the ear, until recently it had

become intolerable. Internal medication with the bromids, etc., was of no avail. The patient was a poorly nourished woman, mother of a number of children, and a history of nephritis. Examination of the ears showed a double otitis media sicca, consecutive to the catarrhal otitic attacks in childhood. The eustachian tubes were normal. Examination of the labyrinth was unsatisfactory. Examination of the urine showed a large amount of uric acid. The author prescribed a severe regimen with the use of laxative waters. This was faithfully carried out, and at the end of a year the vertigo and tinnitus had both disappeared. The author discusses the cause of the symptoms, and believes in the possibility of an endarteritis of the vestibular cochlear artery, and that an incomplete ischemia in this region is the cause of the symptoms. The endarteritis, in his opinion, was due to a uric acid infiltration. *Harris.*

Reeducation, Anakinesis of the Hearing, by the Electrophonetic Method.

RAOULT, Nansie (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie,* March and April, 1912), refers to a previous paper upon this subject presented during the preceding year. He has treated since March, 1911, seventy-one cases by the method. Of these, thirty-nine have had fifty treatments and have been examined recently since the discontinuation; five have ceased treatment for different reasons; the others are still under treatment. He insists strongly that in all cases of otosclerosis complicated by nasal lesions, the latter should first be treated before commencing reeducation. The technic consists in two different acts which are combined. First, the reeducation, socalled, by sounds proceeding from the first to the fifth octave, and which can be gradually increased, voluntarily, in intensity by gradually accustoming the patient to louder and louder sounds. Second, the excitation of tactile sensibility provoked by the passage of stronger or weaker currents produced in a microphonetic circuit which transmits these sounds to the ear. The passage of these induced currents produces a sort of rapid tremulo of sound, a tremulo which can be compared to the intense buzzing which one hears at times in the telephone, which provokes a tickling in the ear. In nervous persons, especially

in women, it is usually necessary to commence with weak sounds, increasing gradually and slowly to arrive at a maximum intensity at the twelfth or fifteen seance only. In men and plethoric women, one can increase the intensity of the sound more rapidly. The duration of the seance varies inversely to the intensity of the current employed. For the weaker currents as long as ten minutes, for those more intense, not more than five. In old sclerotic cases and in the aged we are wont to secure at the beginning a certain intensity of the sound and of the induced current, but it is often difficult to exceed it, or at least not do so except very gradually. The passage of the current induced by the microphonetic circuit produces a sense of tickling at the bottom of the ear, not unpleasant and which ought never be allowed to give pain. The patient should be the guide himself to the operator as regards this. In these old sclerotic patients the first seance does not produce any true tickling. The patients perceive an intense vibration of the drum membrane, a sort of shaking of the entire auditory apparatus, but not that peculiar tactile sensation which a loud sound produces in one who hears. This is why in the old sclerotics it is difficult to exceed a certain intensity of the induced current, at least not until the tactile sensation produced by the tickling has reappeared.

The author considers the physiologic action of the reeducation as consisting, first, of a mobilization and vibratory massage of the bony apparatus of transmission; second, of a stimulation of the muscles of the middle ear; third, a stimulation of the nervous system of the auditory apparatus. The stimulation of the muscles of the middle ear he regards as a fact beyond question, and to this he ascribes the tickling sensation produced by the passage of the induced current. When perceived it denotes an awakening, at least in part, of the muscular sensibility. The stimulation of the nervous system of the auditory apparatus affects the sensory nervous system, the vasomotor system, and the apparatus of perception, involving the hearing. The stimulation of the vasomotor system is shown in the sense of warmth in the ear, at times even in the entire head. One interesting fact, pointing to a new entrance of blood in the parts, is the reappearance of the secretion of cerumen which has been repeatedly noted. He has also noted the disappearance of headache after the treatment.

Finally, the stimulation of the nervous system is shown by the improvement made in the hearing and the progressive increase of the hearing for sounds which were formerly not perceived. In the course of the treatment the patient perceives one day that he hears a clock, the singing of a bird, and other sounds formerly lost to him. The reappearance of the hearing of sounds is due to an increased suppleness of the organs of the middle ear, and especially to the vibratory massage of the muscles. It is impossible to say positively whether the phenomena produced by the treatment leads to a regeneration of the auditory cells. The chief merit of the treatment consists in the persistence and the continuation of the improvement in the hearing after the seances have been discontinued.

The author gives the case reports of two patients where marked improvement was made and maintained. He next proceeds to the interpretation of the lesions of otosclerosis and the indications for the kinetic treatment. He does not believe that sclerosis is a morbid entity, but that it is a result, a terminal stage of different chronic affections of the ear. The principal lesions which are met with in sclerosis are ankylosis of the ossicles, adhesions between the footplate of the stapes and the border of the oval window, atrophy and ischemia of the middle ear and of the drum membrane, and atrophy of the muscles of the middle ear. Following these, appear lesions in the labyrinth. He further maintains that any of the organs of the middle ear can be affected primarily, and nonmobilization of the apparatus of transmission as well as the absence of blood to the part will lead sooner or later to sclerosis of the ear. This initial lesion can affect the nerves, the blood vessels, the muscles, the mucosa, the ossicles, and the periosteum of the bone. Certain symptoms, wont to appear before the onset of deafness, he regards as troubles of auditory accommodation in the ear. Among those which are wont to be met with are pain in the ear, vague headaches, and pain in the head suggesting migraine. The history of such a case, where headache was complained of with pain in the ear, and which was caused to disappear by the reeducation method, is given. He believes that the symptoms are of vasomotor origin. As if to emphasize his position and his disagreement with the Politzer school's view of a primary disease of the labyrinth capsule, he

again states his conviction that the term "otitic sclerosis" represents a number of diverse affections of the middle ear as regards the point of origin, and insists that it should be reserved for the terminal stage of these affections, which is bound to follow as the result of the immobilization of the ossicles, atrophy of the muscles, the fibrous degeneration of the mucosa and periosteum. Before this last stage there exists a presclerotic stage, where the tympanic lesion, according to the cause of its method and origin, can be improved in part. The allimportant condition to be considered is that of the muscular fibers, and the result to be obtained by the kinetic treatment will depend upon whether these fibers are atrophied, if the muscles are interfered with in their action by the adhesions, and by ankylosis of the articulation of the ossicles. The improvement will be less marked in the old adhesive sclerotic cases. On the other hand, in cases of deafness still in the presclerotic stage, the improvement can be emphasized and at times considerable. In all old affections, especially in the aged, cases in which the muscular fibers are atrophied and degenerated, the results of treatment are less marked or absent.

The article, so far as the present number is concerned, concludes with the case reports of twenty patients treated by the method. *Harris.*

Knowledge of Hereditary Otosclerosis, Appearing at an Early Date.

Paul Boncour, Paris (*Archive für Ohrenheilkunde,* Vol. 85), discusses the several periods of development of the subject of otosclerosis, and dwells on the fact that recently doubt has been expressed in various quarters regarding the correctness of the generally accepted definition of Politzer, that it is a disease of the bone primarily affecting the capsule of the labyrinth, associated with certain clinical signs of an advancing involvement of the sound conducting apparatus. He refers to a case reported by Kalenda, of a man of 23 years, who had suffered from typhoid eleven years before, previous to which he had had no trouble with the ear. The patient, some three months after the development of the first ear symptoms, had been examined and showed on both sides the rosy red color of the drum membrane characteristic of otosclerosis. The functional examination gave in the right

ear a combination of symptoms pointing to involvement of the sound conducting apparatus and of the sound perceiving apparatus, while in the left ear there was a similar combination with a pronounced preponderance of disturbance from the side of the inner ear. Kalenda regarded the case as a strong argument in favor of the necessity of modifying the Politzer definition. Manasse believes, indeed, that the doubt is justified, whether the recognized anatomic changes in the bone can be regarded chiefly as the cause of the clinical symptoms, and quotes Habermann to the effect that in otosclerosis we deal not only with a secondary process in the acusticus, but in a primary disease running parallel and independent of the change in the bone, at times found there, even at the beginning. The author, in line with these investigations, gives the history of two half brothers, one aged 12, and the other aged 14, the sons of one mother. The younger suffered at the age of three from a tubercular disease of the right knee joint. For two years there had been failing hearing. Other symptoms were present, including subjective noises. He had at that time a discharge from the ear, which after a short time ceased, with complete restoration of the hearing. Examination showed the drum membrane normal with a dark rosy glow in the lower posterior quadrant. The right drum membrane was more opaque, but had the same reddish color. Examination with the tuning forks gave negative Rinne and an elevation of the lower limit. The examination of the vestibular apparatus was negative. Politzeration had no effect upon the hearing. The older boy showed a year ago a diminution of the hearing with tinnitus at times, often headache, but never had been ill. The appearance of the drum membrane in both ears was normal, with the exception of a distinct rosy red glow in the posterior lower quadrant. The functional tests gave negative Rinne and an elevation of the lower limit, the upper limit undisturbed. The author regards both cases as undoubtedly cases of beginning otosclerosis, showing a clear hereditary history, pronounced lowering of the hearing, and a typical drum picture, with symptoms of an interference of the sound conducting apparatus. He feels that they belong to a group of cases where it can be positively asserted that otosclerosis need in no way begin as a primary disease of the sound perceiving apparatus, but it can in a

typical form make its appearance as an affection of the sound conducting apparatus. He would regard Kalenda's case as a rare combination, and feels that the views of Hammerschlag, that otosclerosis and deafmutism are to be regarded as a hereditary degenerative process, must be questioned until further proof has been brought forward. He concludes as follows: As long as there are cases which from every standpoint are to be regarded as typical pictures of otosclerosis, and show at the same time at an early stage only pure disturbances of the sound conducting apparatus, we cannot accept the opinion that otosclerosis begins at the same time with changes in the sound perceiving and the sound conducting apparatus, nor that it is a primary disease proceeding from the sound perceiving apparatus. *Harris.*

II.—NOSE.

An Attempt at Direct Posterior Rhinoscopy, According to the Method of Arpard.

LAVAL, Toulouse (*Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie*, January 6, 1912), has employed and recommends the direct examination of the nasopharynx by means of bronchoscopic tubes, 80 to 100 mm. in length and 4 to 12 mm. in diameter. He describes the method of anesthesia and the position in which the patient is to be placed. [The abstractor does not feel that it is necessary to refer to the method further than to condemn it. All the difficulties encountered in the procedure can be avoided, and all the results can be secured in the simplest manner conceivable by means of the nasopharyngoscope modified by Holmes of Boston.] *Harris.*

The Supraturbinal Opening in Chronic Maxillary Sinusitis.

INO KUBO, Fukuoka, Japan (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie*, March and April, 1912), advocates this method of opening the antrum of Highmore, as recommended by Siebenmann, for the following reasons: Lavage by the accessory ostium is the rational procedure. Where this is not possible, he punctures in the middle meatus, rarely in the inferior meatus. Where lavage by the middle meatus is difficult on account of the unciform

process or because of the absence of the accessory opening, he is wont to make a free opening in that locality. Second, in "caseating" sinusitis, the accessory ostium is usually very large, at times more than 2 cm. long, and lavage in such cases is wont to produce a speedy cure. The rapidity of the cure depends upon the size of the opening. He accordingly believes in the transfer of a small opening into a large one. Third, the middle meatus seems to him the rational route in order to enter the sinus, because there are two natural openings and the wall is lacking in bone. Fourth, the artificial opening through the inferior meatus in the radical operation has a tendency to close; on the other hand, the window in the middle meatus remains permanently open. Fifth, the large opening in the middle meatus is easier and simpler than by the inferior meatus, as well for the operator as for the patient. Sixth, the patient can wash out his sinus himself by this opening, while lavage by the natural opening cannot be made except by a physician. Seventh, lavage through a large opening is made by a canula larger and less curved and more solid than the canula of Hartmann. Eighth, lavage by means of a large canula through the large opening is also very important, because one can determine the indications when one should abandon conservative treatment for a radical operation.

In place of making the opening with the little finger, as Siebenmann, Kubo has devised cutting forceps, which he uses under cocain-adrenalin infiltration. The author does not favor packing, except for a few days. The operation is difficult in narrow nostrils with a strong deflection of the septum, but is always possible when there is sufficient room to remove the unciform process. He also does not claim that the operation will take the place of the radical operation, but that it is indicated in certain cases. *Harris.*

Phlegmon of the Left Orbit Following an Injection of Paraffin. in the Right Nasal Fossa.

PISTRE (*Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie*, June 1, 1912) reports the case of a girl, 28 years old, complaining of ozena. On the 2nd of May an injection of paraffin was made into the left nasal fossa, with distinct benefit. A month later the injection was repeated on

the right side, the technic being the same. One week following the injection a phlegmon of the left orbit developed. There was a severe coryza involving both sides of the nose, but more pronounced upon the left, and excessive headache. The patient vomited repeatedly, had fever, and lancinating pain in the left eye. When seen by the author there was a complete ptosis in the left eye. The vision was undisturbed. Under general anesthesia an incision was made through the upper eyelid and the orbit explored without discovering pus. A drain was introduced. The operation had no effect upon the chemosis. Gradually, however, the chemosis diminished, together with the temperature. Recovery took place at the end of three weeks. The author considers the possibility of a perforation of the parietal wall, but is inclined to dismiss it. He believes that the infection into the orbit took place through the blood channels. The absence of any involvement of the optic nerve shows that the phlebitis was limited to the ethmoidal veins. *Harris.*

III.—PHARYNX.

Anesthesia in Tonsil Enucleation.

G. GARTHWAITE-FISHER (*New York Medical Journal,* February 24, 1912) employs a solution of one-fifth of one per cent of cocain as a local anesthetic. It is prepared by adding one grain of cocain to seven drams of sterile water, and one-half dram of 1 to 1000 solution of adrenalin. He introduces this into the mucous membrane over the anterior pillar in such a way that it can be seen through the translucent membrane. The injection is made at six points, and altogether 3 to 4 cc. of the solution is used. Perfect anesthesia is claimed by this method.

[The abstractor is strongly of the opinion that in the light of the many accidents which have been reported, the quantity of adrenalin here recommended is dangerous and to be condemned.] *Harris.*

Angiomata Cysts at the Base of the Tongue.

MOURE, Bordeaux (*Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie,* April 6, 1912). The patient was a man aged 20, who complained of difficulty in swallowing. Laryngeal examination showed a tumor transparent on its surface, but more or less opaque at its base, lying at the base

of the tongue. The probe showed it more or less soft to touch. It was inserted by a large pedicle to the lingual tonsil. There was a history that the growth at times ruptured and disappeared. This confirmed the opinion of Moure that the tumor contained fluid. Two years later the increase in growth caused sufficient difficulty in swallowing to demand its removal. At that time it was of the size of a large nut, presenting a reddish color, especially in the lower portion. After local anesthesia the tongue was drawn forward by an assistant and the growth removed by means of the galvanocautery wire. No reaction followed and prompt healing took place. Microscopic examination showed a neoplasm of the fibroangiomyxomatous type with cavernous evolution. The cyst was not a simple glandular retention cyst, but rather a tumor produced from the thyrolingual canal. It was, in effect, a true cavernous angioma of a cystic nature. The author is in favor of the employment of the galvanocautery in such cases. *Harris.*

IV.—LARYNX.

Pathogenesis of Stridor Laryngis.

PIAGGI (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie,* January and February, 1912), after considering the various theories entertained as the result of the observation of a case recently seen and reported in the article, makes the following conclusions: First, that it is a hereditary lesion, inasmuch as the patient had a brother affected with the same disease; second, the affection is congenital, since it showed itself a short time after birth, and it is impossible to determine any other cause. It is associated with other alterations of the form. In the author's case there existed a defect of the soft palate with the absence of the uvula. The peculiar formation of the fissure of the larynx frequently observed, while usually considered as the direct cause of the phenomena, is to be regarded only in the light of a concomitant manifestation. The case of Leori, the only writer on the subject who speaks of having seen the vocal cords, and the author's case, where the cords were seen, demonstrates the possibiilty of a direct examination, and permits of no other conclusion but that the stridor is provoked by the vibration of the vocal cords in inspiration; finally, as regards the pathogenesis, it must be

held that the vibrations are produced as the result of an incoordination of the movements of respiration affecting the vocal cords, and that the hypothesis of an arrest of the development of the nerve centers is correct. *Harris.*

A Contribution to the Use of Heliotherapy in the Larynx.

ALEXANDRE, d'Hauteville (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie,* March and April, 1912), reports the history of three cases of tuberculosis of the larynx which were distinctly benefited by the use of sunlight in the throat. He describes the method employed by Sorgo, and as the result of its use in these cases and others he makes the following conclusions:

Heliotherapy gives in laryngeal tuberculosis an amelioration of the condiitons which is not produced in the same time and in the same degree by any other form of treatment. It is not merely a treatment to be exceptionally employed, only useful in certain patients particularly intelligent, nor to be reserved for only certain forms of larynx, especially favorable. It can be employed by the most simple methods, either by direct insulation or by the method of Sorgo. Both of these methods, however, are fatiguing to the patient. He has accordingly devised an apparatus which allows the patient to receive the rays of the sun while sitting in the shade, and which by the aid of a mirror allows him to obtain a constant view of the illuminated glottis, in this way rendering the sun cure applicable and practicable in all cases. He claims for the apparatus, first, that it does not lose any of the useful radiations; second, it makes an agreement, as far as it is possible, between the field of insulation and the field of vision and the eye of the patient; third, it permits the gradation of the intensity of the solar rays. *Harris.*

V.—MISCELLANEOUS.

Leucoplakia Buccalis, With Report of Three Cases.

ROBERT H. IVY (*New York Medical Journal,* April 13, 1912) reports the study of three cases which leads him to conclude that the accepted opinion that leucoplakia is due to syphilis is incorrect, for the following reasons: First, that in a large majority of cases there are no signs of syphilitic

lesions, past or present, and the patients deny infection. Second, failure of the lesions to respond to any form of antisyphilitic treatment. Third, in two of his cases the Wassermann reaction was negative. *Harris.*

Vaccine Treatment in Colds.

G. H. SHERMAN, Detroit (*New York Medical Journal,* March 2, 1912), believes in the bacterial origin of colds, and says the most common organisms met with are the pneumococci and the streptococci; the micrococcus catarrhalis and the staphylococcus are frequently met in subacute and chronic cases. The vaccine treatment is particularly indicated in cases where one cold follows another. He agrees with Allen that the treatment has the following advantages: First, convalescence is speedier, sometimes almost complete in twenty-four to thirty-six hours; second, the stage of thick mucous secretion is either practically eliminated or rendered much shorter and less distressing; third, the use of expectorant drugs, which so often upset the digestion, may frequently be dispensed with; fourth, the risk of complications is very considerably lessened.

He has employed the method for the last three years and now finds it unnecessary to have a bacterial examination made. Experience teaches him that in acute colds the case is to be immunized against the pneumococcic and streptococcic bacilli. These represent the acute cases. The second class of the subacute cases, usually complicated with a micrococcus catarrhalis, is treated with a mixed stock composed of various strains. He speaks very enthusiastically of the method, and feels that if generally employed, complications such as pneumonia, mastoiditis, etc., would be eliminated. He has applied vaccines, also, in hay fever, using a combination of staphylococcus, pneumococci and streptococci with good results, inoculations being given at intervals of from three to five days. *Harris.*

The Upright Position in Ether Operation Upon the Nose, Throat and Other Portions of the Head.

FRENCH (*New York Medical Journal,* June 1, 1912), after an interval of twelve years, again advocates the use of the upright position for operations upon the nose and throat. Since

bringing forward the subject then, he has devised a table which, after the patient has been anesthetized, can be gradually and easily brought into an upright position. Special appliances accompany it, by which the patient is prevented from sliding off.

French believes this improvement removes the only objection to the method, namely, the difficulty of changing from the dorsal to the upright position. He is strongly of the opinion that this position has decided advantages, among which he names better field of vision, less shock, less ether required, and a smaller quantity of blood lost. *Harris.*

Statistics of Foreign Bodies in the Esophagus and New Simplified Technic for the Exploration of the Esophagus.

BOTALLA (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie,* January and February, 1912) gives the report of twenty-four cases of foreign body in the esophagus and an analysis of the results obtained, as follows: In thirteen cases, removal by esophagoscopy; in three cases it was necessary to do an esophagotomy; in one case the foreign body was pushed into the stomach; in one case it was swallowed and descended spontaneously; in six cases the foreign body was not discovered.

The modified technic which he recommends concerns, first, position—the patient, instead of being placed in the position of Rose, is seated upon a low chair with the back slightly inclined, the head placed upon the edge of the back, the operator standing at the back of the patient; second, as to technic—a metal mandarin, rounded at the end and extending slightly beyond the mouth of the tube, is employed, a tongue depressor is used and strongly depresses the tongue and permits a view of the arytenoids and the entrance of the esophagus. The mandarin is carried along the posterior wall of the pharynx and under the eye of the operator avoids the arytenoids, enters the vestibule, passes the cricoids, where a slight resistance is met, and enters the esophagus

He claims for the method the following advantages: Comfort for the patient in not having to have the head lowered; dispensing with an assistant to hold the head; possibility of employing the method in the office; ability to use it under local or general anesthesia; introduction of the tube entirely under

the control of the eye; avoidance of the use of the mouth gag.

Among his conclusions as a result of these twenty-four cases are the following: That the position of Rose and that of Botalla are the best for the exploration of the esophagus; when the foreign body lies high up in the esophagus the tube can be introduced without a mardarin; the tubes used should be the largest possible, even in infants, because of the great elasticity of the esophagus. This is especially desirable where pieces of money have been swallowed. The caliber of the tube in the simple explorations need not be more than 9 cm. Local anesthesia in adults is not necessary except in timid patients. In children general anesthesia is preferable and is far more convenient. *Harris.*

Gonococcic Stomatitis.

JOURDIN (*Archives Internationales de Laryngologie, D'Otologie et de Rhinologie,* January and February, 1912) reports two cases of stomatitis regarded by him as of gonococcic origin. After a consideration of the literature upon the subject, he concludes that there can be no question but that the gonococcus can live in the mouth. He admits that it is open to doubt whether it is the cause of the stomatitis or only a coincidence.

The several cases reported divide themselves into two groups: First, those cases occurring in infants presenting at the same time an ophthalmia; second, those occurring in adults who have had an ophthalmia and where the connection between the stomatitis and the ophthalmia can be traced. In the first category the stomatitis shows itself as a rapid complication of the ophthalmia by the penetration of the gonococci in the nasal fossæ, which is often involved, and from there into the mouth. In such cases the specific nature of the stomatitis cannot be denied. While in adults the local or general affections as a possible cause of the stomatitis cannot be excluded, reasoning from infants, the author favors the theory of a specific cause here also, and so is of the opinion that there exists a stomatitis of gonococcic origin less rare than is supposed, because attention has not been directed to it and because the etiology is often obscure. *Harris.*